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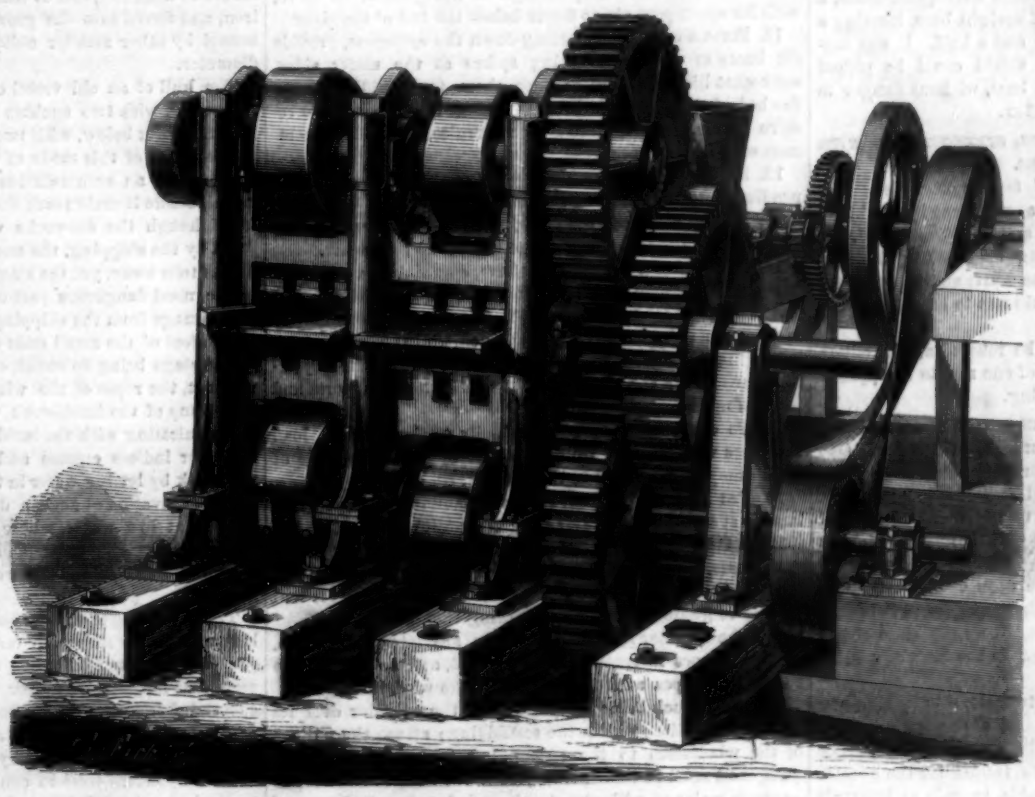
Improved Machine For Pressing Bricks.

One of the obstacles in the way of forming and burning bricks so that they shall possess a perfectly smooth surface with well-defined edges is the presence of atmospheric air in the clay, which in burning expands and finds its way through the material to the surface, producing blow holes and cracks. The machine represented in the accompanying engraving is constructed with a special view to overcome these obstacles to the production of a perfect article. It is invented by a practical brick maker of over thirty years experience, and the result of fifteen years experiments. It was patented through the Scientific American Patent Agency, May 14, 1867.

The machine is wholly of iron, with the exception of the foundation on which it rests. The uprights which support the machinery are hollow cast-iron columns held in position by means of wrought-iron bolts passing through them, and strongly braced by flanges acting as buttresses between the base and columns. There are two heavy shafts, one directly over the other, driven by means of pinions and gears as seen in the engraving. Two sets of molds, of three bricks each, are used, working alternately, the main pressure coming on three bricks only, at one time, the machine making six bricks at each revolution of the shafts. Each shaft drives a series of plungers worked by cams, the peripheries of which force the plungers against the clay in the molds, and grooves extending around the cams following the contour of the face, draw the plungers back from contact with the clay. The upper plungers are formed with convex faces and the lower ones with level faces. The upper portion of the molds is beveled or flaring, so that this part is wider than the remainder. In operation the upper plungers are forced by their cams down upon the clay in the molds, the lower plungers remaining stationary and forming a bed for the compressed material. The lower plungers then rise against the clay, the upper ones also rising, until the clay has reached that portion of the molds where the bevel of their sides begin, when the upper plungers again descend with a gradual movement, the clay being subjected to pressure on both top and bottom, the convex surfaces of the upper plungers acting upon the central portion of the clay so that the air in the clay will be forced outward, where the flaring sides of the molds allow it to escape.



CROFOOT BRICK MACHINE.

There is a device, working automatically, which carries the clay from the hopper to the molds, which is not shown in the engraving. It works in harmony with the plungers, as all the connections of the machine are perfectly absolute, their being neither spring, weight or other adventitious or unreliable device employed. The clay is taken from the bank and without any seasoning or preparation passed through the pulverizer, thence directly to the molds. All the bricks are face and front bricks equal to the best Philadelphia facing bricks. The inventor in a letter says:—"We have burned a kiln of brick made by the machine and every one who sees them is surprised that so smooth, solid, and nice a brick can be made from so coarse a material as the Chicago clay; they not having a crack or even a check, and resembling in their finish enameled ware. The bricks are taken directly from the machine to the kiln, as when they leave the machine they are perfectly hard."

Orders and other communications relative to the machine should be addressed to the Crofoot Brick Machine Co., 229 Lake street, Chicago, Ill.

The American Tube Well.

Probably no invention of the present day is causing among scientific men so much attention as is this exceedingly simple and yet most efficient apparatus for obtaining, in almost all situations, pure water at a small outlay. It consists of nothing more than an iron tube perforated with holes at the lower end, and shod with a steel point, which enables it readily to penetrate the hardest soil. This tube is driven into the ground vertically by means of repeated blows given by a hollow monkey working on the tube as a guide. These blows are received upon a strong clamp firmly gripping the tube near the ground, the clamp being from time to time raised as the tube descends into the earth. The process of driving is continued until it is ascertained, by means of a plumb lowered into the tube, that a water bearing stratum has been reached. A pump is then attached to the tube, and the water obtained; at first the water pumped up comes thick and dirty, but after a while it comes clearer and clearer until that is perfectly pure which remains. It is evident that, apart from the simplicity of the tube-well system, its great advantage is in the purity of the water obtained. In no ordinary dug well is it possible to prevent surface water and land drainage from mixing with the purer water springing from the bottom; indeed, it is very questionable if in any case an open well is more than a cesspool in which the drainage from all the surrounding soil is collected. The unhealthy character of many localities may fairly be traced to the deleterious nature of the water supply arising from this cause, and it must always be a matter of vital importance to obtain water cut off from these impurities, and if possible drawn direct from the natural source. This the patent tube-well system most completely effects, for the tube driven into the ground seals up the well from all surface drainage; indeed, if the sinkers come to water inferior in quality or quantity, they may drive through that into a lower and better stratum, and completely exclude the upper water; and then, as they pump, the smaller particles of soil pass through the perforations into the well and are drawn up, leaving behind a bed of gravel and small stones, which forms a natural reservoir and filter to each well, and insure the purity of the water subsequently pumped up. This invention is known and appreciated by the Americans, who, in 1860, employed it in the Northern army to supply their troops with water all through the campaigns. It is of more recent introduction into this country, but is already beginning to be adopted by all those who value the purity of water. The government, after testing it practically at Aldershot, have sent a special brigade and a number of wells with the Abyssinnian expedition. The Emperor of the French has had several wells sunk under his own personal supervision, with most decided success, both at Buchy and near Paris, and has ordered a number for the use of the army and school of agriculture.—*London Mechanics' Magazine.*

Improvements in Automatic Telegraphy.

Since the 11th September, 1867, the directors of the telegraphic lines have made use, in the service between Paris and Lyons, of a new system of rapid transmission invented by MM. Chaudassaignes and Lambrigot, telegraph clerks. This telegraph acts automatically, transmitting the dispatches between the two towns at the rate of 120 or 180 dispatches per hour by a single conducting wire, a velocity three times as great as that obtained by other systems, and capable of being augmented proportionately to the diameter of the wire. The transmissions are made by a band of metallic paper on which the signals composing the dispatch are traced in insulating ink. The reproduction is obtained on a band of unsized paper, the center portion of which is impregnated with a chemical liquor necessary for the formation of the characters existing on the metallic band. In order to obtain regularity of execution in the different operations, such as the composition, transmission, and reception, they pass through several hands according to the requirements.

One instrument in communication with the line is composed of—1. A clock-work movement. 2. A double roller which sets at work either the metallic or the chemically prepared paper. 3. A ringing apparatus for calling the attention of the correspondent. 4. A "Morse" manipulator of ordinary construction for the exchange of the conventional signs necessary for setting in movement or stopping the rollers. The clock-work movement is set at work by a weight easily wound up by means of a pedal; it serves to maintain the rollers in movement. Near the roller round which the metallic band passes, is a point which represents the extremity of a conducting wire. The roller communicates with the electric pile. When the band is drawn into movement by the rotation of the roller, the point is placed sometimes on one of the metallic parts of the band, and sometimes on the written parts of the dispatch where the isolating ink is, so that the conducting wire marks the message by the alternate passage, and breaking of the current. Near the roller, on which is coiled the unsized paper, is placed a cup filled with a solution of nitrate of ammonia and ferrocyanide of potassium. In the middle of this cup is a small roller which dips into the liquid in its lower portion, and the upper portion of which rises a little higher than the edges of the basin and supports the band of unsized paper which, drawn by the rotation of the two rollers, turns the small dipping roller and becomes impregnated with the solution.

A point of iron representing, like that of the metallic band, the extremity of the conducting wire, leans, slightly inclined, resting by its own weight upon the damp paper band, and is in communication with the earth. The voltaic current decomposes the wet portion, and leaves a colored deposit which represents the signals of the dispatch. The working of this apparatus is entirely mechanical. The transmission and the reception of the dispatches take place automatically; one clerk superintends the machine. In order to compose the dispatches into conventional signals on the metallic band, another instrument, called the compositor, is employed, similar to that of Morse, the signals of which are employed. The band of metallic paper unrolling itself is raised by a lever so as to touch a thick roller covered with a resinous preparation in fusion, which cools suddenly as soon as it is applied to the metallic band. One clerk can prepare alone 35 to 40 dispatches per hour; the telegraphic staff acquainted with the Morse apparatus can, without any study, compose dispatches. For the service between Paris and Lyons three compositors suffice completely for the transmissions. The dispatches reproduced on a band of chemically prepared paper are handed over to other clerks, who translate them for the printed dispatches distributed to the public.

The result is that two composing clerks, two translating clerks, and a superintendent of the machines of reception and transmission, do as much work by aid of a single conducting wire as six clerks with three wires by the ordinary telegraphic system. A composing apparatus furnished with electro-magnets has been established on a line from London to Paris. When the employé in London wishes to transmit a telegram to Paris for the Lyons line, the only line in which this rapid service is installed, he manipulates as for the ordinary transmissions of the Morse apparatus; the letters or conventional signs are printed on a metallic band, and a few seconds afterwards are transmitted to the chemically prepared paper. Thus we have before us a great improvement in modern telegraphy. Up to the 11th September last the service of the Lyons line was carried on by aid of two or three Hughes' apparatus; each apparatus occupies two clerks and three batteries. By the new system five clerks do all the service with one line only. The new system works admirably and without a single hitch, and we can affirm that the invention of MM. Chaudassaignes and Lambrigot is destined to render great service to the telegraphic service. The econ-

omy of installation, and the saving effected in the number of clerks, the maintenance, wear and tear, etc., are marvellous.—*Chemical News.*

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

SUB-AQUEOUS AND OTHER TUNNELS.

[Continued from page 18.]

PLAN FOR A COMBINED WOOD, CEMENT AND CAST IRON TUNNEL.

This projector presented plans for four different sizes of tunnels, with variations of the form in each, from which the company was to choose. One plan was for a tunnel having a mean diameter of about 11 feet. The sides were to be on a curve of 12 feet diameter, the bottom on a curve of 10 feet, and the top 7 feet diameter. Another was to be 16 feet in diameter, and another 9 feet, both having varying curves. Lastly, a plain tube of 9 feet diameter was shown. The material and method of construction was the same for all.

The body of each tunnel was to be composed of segmental plates of cast iron, with projecting flanges at their four edges, turned outward, by which flanges the plates were to be fastened together with nuts and screws.

Outside the cast iron tunnel thus formed, a body of cement or hard-rammed clay, five or six inches thick, was to be laid, and the whole was to be inclosed in a casing of wooden planks.

The method of laying was to excavate under the bed of the river. For this purpose, where there were quick-sands, a shield was proposed having a face of upright bars, forming a grating, with separations of an inch and a half. It was supposed that the sand in front of the shield could be picked down into the tunnel through the bars, without danger to the workmen from too sudden an influx.

PLAN FOR A WROUGHT IRON TUNNEL, STRENGTHENED WITH CAST IRON RIBS.

This project was for a tunnel 27 feet in diameter. The cast iron ribs were to be one foot apart, three inches broad and four and a half inches thick, scarfed at each end, the scarfs two feet long and overlapping each other, fastened with seven bolts passing through the scarfs and through the wrought iron tunnel plates. Each rib was to be composed of sixteen pieces.

The wrought iron plates were to be rebated at the edges, two and a half feet long, the joints of one row to be opposite the middle of the plates next adjoining.

PLANS FOR DOUBLE TUNNELS, IN BRICK, ALSO IN CAST IRON.

These were projected by W. Murdoch, of Paisley. One plan was for a double tunnel in brick—that is to say, tunnels, one upon the other, of elliptical form, 27 inches thick. Another plan was for a two-story tunnel made of flanged plates of cast iron, secured together with bolts, the joints of the plates calked with lead. The division consisted of an iron floor, secured to the sides, which were straight, the bottom flat and the roof arched. Another form for the division or floor consisted in having shelves cast on the sides of the iron plates, which supported a floor in the form of a brick arch.

Another plan was for two brick tunnels, side by side, the roof supported centrally on arches. In a similar cast iron tunnel the roof was to be centrally supported on pillars. Another plan was to make a single tunnel for the greater part of the distance with short double tunnels at intervals of 200 or 300 yards, for the passage of teams.

PLAN FOR A SMALL BRICK TUNNEL, AND PECULIAR METHOD OF LAYING IT IN THE RIVER.

We come now to a novel plan for laying down a brick tunnel, which was proposed by Charles Wyatt and John Isaac Hawkins. This plan attracted great attention, and seems to have been at one time the favorite choice of the Thames Archway Company. Some of the parties interested in the company went so far as to lay down an actual section of this tunnel in the Thames river, for the purpose of publicly demonstrating the practicability and cheapness of the plan. It is a tunnel of about the same size as this that is now proposed to be laid under the river between New York and Brooklyn. We shall first describe the method and then give some account of the laying of the experimental section:

Width of the Thames river at high water,	847 feet.
Ditto at low water.....	649 feet.
Greatest depth at high water.....	38 feet 7 inches.
Ditto at low water.....	16 feet 9 inches.

It is proposed to make a brick tunnel, of a cylindrical form, 10 feet 9 inches in diameter outside, and 8 feet 6 inches inside, leaving 13½ inches, or one brick and a half, for the thickness of the wall. The tunnel to be built in lengths of 50 feet each, and floated over the required situation, where they are to be sunk into a trench prepared for their reception, and afterwards covered over with earth even with the bottom of the river.

The particulars of the operation are detailed as follows:

1. In a dock communicating at pleasure with the river, build a cylinder with bricks laid in Roman cement, 50 feet in length.

2. Let the ends of the cylinder be formed into steps and other projections, to keep it even with the other cylinders to which it is to be joined.

3. Close the opening at each end with an hemispherical wall, and in the upper part of the cylinder, about 6 or 7 feet from one end, fix a cast iron tube, of 6 inches bore, having a conical plug ground into it. To the lower end of this tube screw or bolt another tube, 8 feet 3 inches long, and on the upper end screw or bolt a pump, of rather larger diameter, reaching at least 46 feet perpendicularly above the cylinder.

4. At 6 or 7 feet from the other end of the cylinder, insert a piece of iron, into which screw a mast, standing parallel with and reaching the same height as the pump, being also of the same diameter. Both these must be supported by braces, screwed into pieces of iron fixed in the brickwork. The axes of the pump, mast, and cylinder, must be all in the same vertical plane.

5. At the distance of 12½ feet from the ends, let into the upper part of the brickwork two iron hooks, strong enough to suspend, in water, the cylinder with its appendages. These hooks may be supported by iron hoops inclosing the cylinder.

6. Fix a cock in one end of the cylinder, near the bottom, having a lever worked by a connecting rod 40 feet long.

7. A man hole, secured by a strong iron plate, should be left at the top of the cylinder, in case it may be found necessary to examine the inside.

8. Put inside the cylinder, for ballast, paving-stones enough to form a pavement 5½ feet wide, and a sufficient quantity of pig or other iron, to make it float with the masts upright.

9. Admit water into the dock to float the cylinder; shift the ballast till it floats upright; secure the manhole, and force the cylinder under water, where it should be kept for some time. When the work proves to be water-tight, take down the pump and masts, with their braces, observing to mark them so that they may be put up again in the same situations.

10. While the cylinder is under preparation, dig, in the deepest part of the river, and in the line where the tunnel is to be laid, a trench deep enough for the cylinder to lie in, with its upper part about 6 feet below the bed of the river.

11. Form a scaffold for letting down the cylinders, provide six bases of cast iron, having spikes at the under sides, somewhat like a harrow, to keep them from sliding along the bed of the river; each base having three sockets, to receive as many balls, armed with ferrules, into which common scaffold poles are fixed.

12. Lash together the three poles so that they stand perpendicular to the plane of the base.

13. Fix, by means of the poles, three of the bases in a line on each side, near the edge of the trench, 16 feet apart.

14. Lay, across a barge, a platform, containing two windlasses, of the double-barreled kind, 25 feet asunder, each 10 feet long; the larger diameter 2 feet, and the smaller 20 inches; moor the barge over the trench, untie the three poles belonging to each base, and tie them to those of the adjoining bases and to the platform, so that they form supports and braces for it.

15. To counteract the specific levity of the scaffold, load the bases with pigs of iron, let down by ropes, the ends of which may be made fast to the scaffold.

16. Put a rope of at least 2 inches diameter on each wind lass, to suspend the cylinder by, and a pulley on each rope.

17. A steel spring should be laid under each axis of the windlasses, to indicate, by the degree of flexure, what force is at any time exerted on the ropes, by which means it will be easy to guard against overstraining them.

18. The cylinder may be guided in any lateral direction, by small ropes fastened to the scaffold, and acting on the suspending ropes at a distance below the windlasses.

19. Thus much being prepared, tow the cylinder over its destined situation, within the scaffolding; attach the pulleys of the windlasses to the suspending hooks, and erect the pump and mast in their places; turn the cock so as to let in as much water as will give to the whole a small degree of specific gravity more than water; ease it down gradually by the windlasses, until it arrive at its proper place, which will be known by the tops of the pump and masts being in a line with fixed points on the shore.

20. Throw in earth to surround the cylinder, and when it is properly bedded let in water equal to the weight of the pump, masts and braces, and after drawing the pump buckets, and forcing the conical plug into its place, the whole of these may be taken away, after which the cylinder may be covered with earth taken from the next excavation, even with the bottom of the river, except the ends, which must be guarded till the next lengths are down.

21. Remove the scaffolding to a new situation for putting down the next length, which will be proceeded with in the same manner as the first, taking care that the ends of the cylinders be made to fit each other and brought into contact; but should this not be perfectly effected, the surrounding earth will form a sufficient barrier to the water, until it can be stopped from the inside.

LAYING THE SECTIONS.

A brief statement of the progress of an experiment made for the purpose of ascertaining the practicability of constructing cylinders of brick-work, and of depositing them through the water, on a given spot in the bed of the River Thames, at Rotherhithe, with a view to the formation of a tunnel for foot passengers under the river, from shore to shore. This experiment was begun in October, 1810, and finished in June, 1811, by John I. Hawkins, engineer:

Two cylinders, 25 feet long, 11 feet 3 inches external, and 9 feet internal diameter, were built of bricks laid in Roman cement; the ends of these cylinders were closed with spherical bulk heads of the same materials; a hole 20 inches in diameter secured by an iron plate was left in each bulk head, and in the top of the cylinder; a pipe was fixed in the top of each cylinder, reaching nearly to the bottom, and a pump 25 feet long fitted to the upper end of it; an air pipe was also made to screw over a hole left for the purpose; a cock of 3 inches bore was placed in one end of each cylinder; masts for sight poles, 22 feet long and graduated, were erected on the ends of the cylinders, and braced from the sides.

These cylinders were built in a barge, and launched into the water by sinking the barge; they floated about two feet out of water.

An excavation was made in the bed of the river near to low water mark, by the means commonly used for taking up ballast.

A stage was erected over the excavation, consisting of a platform 28 feet by 12, supported on six upright legs, and kept steady by twelve very oblique braces, formed of scaffold poles and spars from five to nine inches diameter; these poles and spars were pointed and loaded with iron to overcome their buoyancy, and sunk into the ground by the weight of the platform, which was 33 feet above the bottom of the excavation and always out of the water at high tides; on the platform were two windlasses of the double-barreled kind.

The stage, which by reason of its numerous braces might have borne a great shock, was nevertheless defended from the shipping by two hexagonal sets of floating booms, one set within the other, but so detached that the outer booms might be torn away by ships running against them without injuring the inner; each boom consisted of three Quebec spars of about 12 inches diameter, lashed together, and from 35 to 45 feet in length; the inner booms were held by four anchors with single chains, and two anchors with double chains, the anchors being from about 500 to 700 weight each; the outer tier of booms was fastened to the inner by slight ropes.

In case the anchors should yield, the booms were hindered from pressing against the stage by six piles from 10 to 14 inches in diameter, and 45 feet long, pointed and loaded with iron, and forced into the ground by their own weight; and braced by other smaller oblique piles from 6 to 9 inches in diameter.

The hull of an old vessel of 160 tuns was moored above the booms, with two anchors ahead and one astern; and a 70-tun lighter below, with two anchors.

The object of this mode of defense was to check, by a succession and an accumulation of resistance, the force of any vessel, before it could reach the stage, and it proved effectual; for although the outworks were much and repeatedly injured by the shipping, the anchors being often dragged and booms torn away, yet the stage remained nearly four months in the most dangerous part of the river, without sustaining any damage from the shipping, except the breaking off four or five feet of the small ends of two scaffold poles.

The stage being defended, one of the cylinders was floated under it, the ropes of the windlasses fastened to two hooks on the top of the brick-work, the pump fixed upon the pipe communicating with the inside, the air pipe screwed on, the masts or indices erected and braced, and, at high water it was sunk by letting water in through the cock, and deposited in the excavation at such a depth that the upper part might be seen at low water, where it was kept suspended while gravel was thrown down and rammed under the bottom to support it. The rammers were fifty feet long, and a little heavier than water.

The stage was then removed 25 feet nearer the shore, the legs and braces singly, by means of an anchor-boat, and the platform with its windlasses, &c., all together at high water, upon four large buoys; after which the second cylinder was suspended from the windlasses in the same manner as the first. At high water the cylinder was let down to its proper depth, and moved laterally by means of ropes, until the ends of both cylinders were in contact, and their axes in the same vertical plane, a half hoop of iron which projected over the end of this cylinder rested on the top of the one before laid down, but the inshore or south end was higher by three inches than was intended.

These facts were ascertained by the tops of the four masts on the ends of the cylinders, which were at that time three feet out of water.

In this situation gravel was thrown down and rammed under the middle and north end of the cylinder; two strong poles, pointed and shod with iron, were driven down by the east side of the cylinder, and their tops secured to the platform, to prevent the cylinders being removed by the strength of the ensuing ebb tide, before a sufficient bank of earth could be thrown down to keep it stationary.

The excavation had been made deep enough, but the inshore end of the cylinder grounding on the bank at low water the day before the operation of adjusting took place, brought so much earth down to the bottom as to prevent that end of the cylinder being lowered again as deep as it should have been by three inches; this earth might have been removed again in two or three tides, as it had been before, but under the apprehension of being ordered by the port committee to take the works out of the river, I determined to conclude the experiment without regard to that three inches, since the only inconvenience was, a space of one inch and a half between the ends of the cylinders at the lower side, although they were in contact at the upper; and no doubt was entertained of keeping the water from passing through this space in any quantity that should hinder the calking of the joint from the inside.

At the succeeding low water, the cylinders were found to be exactly in the situation indicated by the masts at high water, after which the joint was covered with a mixture of mud and gravel, but owing to the want of a sufficient bank of earth at the sides, it laid but a few inches thick on the top, and this sliding off at low water, wanted that compactness which was necessary completely to stanch the joint; the influx of water, however, through the joint, was scarcely eleven gallons a minute, when the water in the river stood three feet higher than that within the cylinders.

These were the principal features of the experiment. The

only thing met with worthy the name of difficulty, was the defending of the stage against shipping.

In proceeding with a tunnel, I would propose to adopt the modes pursued in the experiment, with scarcely any other exception than the defense; which must be more efficient and less extended, and one that can be removed and pitched again at the same time with, and while surrounding the stage.

To be continued.

For the Scientific American.

Slack Water Navigation.

Since the general introduction of railroads, inland water transportation has occupied a position of secondary importance, being mostly confined to the larger and easily navigated rivers. The Erie canal, and one or two others alone, exist in a flourishing condition, the remainder having been converted into road beds for railways, or lapsed into utter disuse through the competition or the intrigues of railroad "rings."

The construction of canals, as a means of transportation, has wholly ceased in this country; and the more rapid, but expensive conveyance of the railway train has caused canal travel to be remembered as among the things that were.

The damming of unnavigable streams, and thereby obtaining what is generally termed "slack water navigation," is nearly as old as history itself; and though it is practiced extensively in other countries, it seems to have been almost wholly overlooked by a people proverbial for turning everything to the very best account.

This neglect is, in a great measure, due to the mania for building railroads, which has for a number of years past absorbed the attention and capital of the American people, without yielding a return at all proportionate to the outlay.

In most of the well-inhabited sections the unnavigable streams are dammed for water power; and frequently at such short intervals, that the water is backed up from one dam to another, being thereby deepened sufficiently to float heavily laden barges, or even small steamboats. All that is required to make these streams navigable for many miles is the construction of locks at each dam, and perhaps some dredging or cleaning out of the channel in certain places: or the interpolation of a few additional dams at points where those previously constructed are too remote from each other to back up the water to the proper depth.

The expense of such improvements being disproportionately small, in comparison with the benefits resulting, the stock representing the investment would possess a stable character, which would always maintain it at least at par; a condition by no means common to the majority of railway stocks.

Something over a year ago the project of converting Rock River, in Illinois, into a slack water stream, was seriously entertained by the inhabitants of the counties along its banks, and measures were taken to forward the enterprise. A memorial to Congress resulted in a preliminary survey, ordered by the Government; and the general estimates obtained exhibited the fact that the outlay requisite to render the river practicably navigable, from Green Bay, on Lake Michigan, to the Mississippi River, at Rock Island, was quite small, as there were but few additional dams required; those already constructed for water power purposes being sufficiently approximated throughout the most part of its course. The cutting of a few miles of canal, to connect the river with Green Bay, and some dredging and deepening of the channel at a few points, was all the work that was requisite, beyond the construction of the locks and the dams above mentioned.

The employment of barges and steam towboats is contemplated on this river, and its improvement is undertaken chiefly for freighting purposes; but there will doubtless be sufficient travel to employ a few light, swift steamboats, a mode of conveyance nearly as fast, and considerably safer, than many of the western railway trains.

When this enterprise is completed, the rapid development of the country lying along the stream will probably have the effect to direct public attention to this *old* feature of internal improvement, and induce the similar utilization of other streams.

The public, when its attention is directed to this important subject, will behold the means of placing themselves within cheap and easy access of the central markets. It is not at all essential that the streams be large or deep to obtain sufficient depth of channel for barges, or small steamboats; as a few feet of water would amply suffice to float vessels of the requisite tonnage for inland trade. Steam propulsion being perfectly admissable (there being no artificial banks to be washed as with canals) the cost of transportation would be so lowered as to permit the carrying of all available freights; and the employment of fast steam packets would provide a means of travel more pleasant and quite as rapid as the accommodation trains on many railroads.

The West, South, and Southwest, and some portions of New York and the Middle States, are watered by streams, equally susceptible of slack water improvement, as Rock River, before mentioned; and now that the experience of years has fully demonstrated that railroads do not invariably conduce to the prosperity of the section of country through which they simply pass, it is to be hoped this important means of progress will no longer be ignored.

In Canada, slack water navigation has proved highly advantageous; and the Chinese, though generally supposed to be a slothful and groveling nation, have utilized their minor streams in this manner, wherever it was possible, so that millions of tons of freight annually pass to and fro, in many parts of the celestial empire, through a network of broad natural canals, obtained for the most part by backing up small streams with rude but substantial dams. Their smaller boats are open batteaux, called *sam pans*, which are drawn from the lower to the upper levels, by means of an inclined plane connecting the two. The bow of the *sam pan* enters upon the lower part of the incline, and the bight of a stout hawser is brought by two vertical windlasses or capstans to take the strain upon the stern. The capstans are turned by man power, which, in that country, is cheaper than horse power; and the freighted vessel thus actuated up the slippery plane, enters with a splash into the upper level. In the larger canals locks are employed, but the amount of freight that passes up and down any one of these inclines, in a day, would probably astonish a Vermont railroad superintendent.

There is hardly a State in the Union in which there is not at least one stream capable of slack water improvement, which, if so improved, would greatly enhance the general prosperity of the State, besides increasing the value of the lands lying immediately adjacent.

A Theory of Artesian Wells.

MESSRS. EDITORS:—I think an explanation to your correspondent's inquiries regarding artesian wells may be given upon the geological theory of subterraneous currents, a subject that has received much attention during the past ten years, by all of our best geologists. When springs of water make their appearance at the surface, it is plain to be seen that it is not from the slow process of percolation, through porous rock, but that it comes, directly and without much obstruction, from some parent stream, hundreds of feet may be, beneath the impress of man's foot. Again, how common it is for streams of considerable magnitude to sink or be absorbed in the earth, to rise again many miles from their place of exit; while in some more rare cases they sink, and by the process of percolation, large caverns are filled, although hundreds of miles may intervene between the source and place of reception; and long, and tortuous, and dark, may be its travel, still the all-pervading law of attraction commands each aquous particle to find its level, and on it moves until the great law of nature is fulfilled.

That subterraneous currents and caverns should exist in a formation such as that described by Mr. Rumley, where compact transition or mountain limestone (called by Mr. Rumley coarse sand or gravel, and as hard as baked pottery) is the prevailing rock, is but in accordance with the fundamental theory governing the secondary and tertiary formation. Probably there has been a large cavern between the secondary and tertiary formation in extent commensurate with the area of that given by your correspondent as the "Artesian Well region," which has been the reservoir of an underground current of water which carried with it a sedimentary substance of white sand, and a deposit taking place, the cavern became filled with what your correspondent calls water sand.

But, says your correspondent, Why does a deposit take place in the current? Why not follow the water course for all time? Because of the attraction of gravity on the sand being too great for the force applied to remove it; or its specific gravity being too great to be removed by the force applied, while the water is seeking its level, and the cave becoming filled; which may be a basin, the bottom of which being fifty feet below the sinus that conveys the water to it, while the same may be three hundred feet above the inlet to the cave, while the outlet is higher than the point of entrance, and by percolation at that; so that the residuum would remain at rest in the cave, but while a sufficient force is applied in accordance with the laws of hydrostatics, the water continues to move on. But, it will be asked, if there is an outlet as well as an inlet to the cavern, where does the pressure come from that makes the water pass through an artificial opening? The source of supply is greater than the capacity for distribution. Consequently, when the artesian borer passes his auger into the cavern, there is sufficient pressure to cause a spontaneous flow of water to take place, and which will continue to flow until a multitude of openings are made, so that the exit of water will equal or excel the supply; or until some internal commotion of the earth will take place, and turn the water in some other channel.

The subject of subterraneous currents is receiving much attention from American geologists, when connected with caverns; and a somewhat singular instance is recorded in Taylor's Geology, when a well was sunk by an eight inch auger to the depth of two hundred feet, when a torrent of water came rushing to the surface, bringing with it small fish three and four inches long, while the nearest stream of surface water was from ten to twelve miles from the well.

Caverns become very interesting when we find hidden in their dark recesses skeletons, and bones of large mammiferous animals, which have been hidden from the light of the sun, perhaps for hundreds of years; and we go a step further in our examinations, and find the bones and skulls of human beings, mixed with those of quadrupeds which have long ceased to exist. And as we advance from place to place with our investigations, and pass through the bone caverns of Germany, where lay covered with clay large piles of bone and teeth of carniverous animals, we are naturally led to ask in what manner, and in what epoch, these bones of animals and skulls of human beings were deposited; and in our anxious desire for the answer, our minds are often carried beyond the pale of mental jurisdiction, and reason ceases to be our guide.

E. H. PARDEE, M. D.

San Francisco, Cal.

Tides and their Causes.

MESSRS. EDITORS:—Under the above heading, on page 408, Vol. XVII., a Lancaster correspondent propounds what he terms a "more rational theory for the phenomenon of the daily tides," than the antiquated notion of lunar influences. At the threshold of the discussion he tells us, that "the water on the surface is, by centrifugal force" (mark ye, centrifugal force), "made to roll around the earth, the same as the water is made to move around the grindstone when in motion." Now, we know that the word "centrifugal" means flying from the center, and that, if not countervailed by the centripetal force of gravitation, the centrifugal force would cause the water on the surface of the earth (and the grindstone, too) to fly off in a tangent to the periphery of the curve; instead of causing it, in compliance with your correspondent's notion, "to roll around the earth." But what that motion has to do with the further development of his views is not clearly apparent.

The admitted fact of the diurnal revolution of the earth, with an equatorial velocity of about a thousand miles per hour, is referred to as the proximate cause which, aided, and in its effects modified by the intervention of Capes Horn and Good Hope, produces the phenomenon of the water rolling around the earth, with the "oscilations to and fro, gurgitation and regurgitation," etc. "These gurgitations," he says, "swell the water"—meaning, as the context implies, raise the tides. Admitting all this to be "just so" where are we? Why, on the crest of the wave. He has got the tide up, but does he show us, satisfactorily, how and when he gets it down again?

The force impressed upon its surface waters by the diurnal revolution of the earth is not a variable but a constant force. But its effects are greatly modified by the proverbial variableness of the winds, as regards both their courses and their intensity, from the comparative uniformity of the "trades," etc., to the violent and erratic forces of the hurricane. Now, if I correctly apprehend the views of your correspondent, he ascribes the ebb and flood of the tides, almost exclusively, to the forces treated of in this paragraph. But he is bound to go a step further, namely, to educe from these uncertain and variable causes that precise and definite periodicity in the alternations of ebb and flood, which we all know they do actually exhibit. But this, I confidently assert, he cannot do. Whereas the moon theorist, knowing the fact that the ebb and flood, when not disturbed by storms, etc., time their alterations in rigid accordance with the regularly changing position of the moon in relation to the earth, deduces from this fact, with infallible exactness, not only the hour but the minute and second of their recurrence. And these predictions are not only carried through year after year, but may, with equal exactitude, be extended throughout the ages. Now, until your correspondent shows us that his "more rational theory" can accomplish all this, I for one must persist in my fealty to "the man in the moon," and vehemently protest against deposing him from the regency which the dwellers on this sublunar sphere have so long and so pertinaciously accorded to him.

L. M.

Germantown, Pa.

"Harmony" of the Churches.

MESSRS. EDITORS:—I notice, in your No. of Dec. 7th, an editorial article on "Sound;" and it is a subject that, I think, requires further "utterance." In the new and growing towns and cities of the United States, and especially in the West, numerous churches are being erected, each of which must have a bell when completed. Now the question should arise in the minds of each one of the bell-wethers of these churches—when the money is raised for the purpose of procuring one—at what *tone* shall our bell be pitched to harmonize best with those already within hearing, and which are liable to be rung at the same time. This is a point upon which the majority of bell-wethers are profoundly ignorant; and as it is simply a matter of science, the SCIENTIFIC AMERICAN should be able to give the proper information.

I happen to live in a small western city, where the churches all happen to be on one street, and not far apart. There seems to be a traditionary idea that all church bells should be pitched somewhere about the keys of A to C.

Our churches each have bells, and they ring simultaneously; and the harmony they represent is about like that between the churches themselves—kinder mixed, and not at all pleasing. Fortunately one of our leading bells must be replaced with another. Now the question arises, to what keys shall Calvinism, and Armenianism, and Baptistism, and Episcopalianism, and Catholicism, be respectively tuned, in order that the sinner will not "stop his ears" when he hears the simultaneous gospel invitation on a sabbath morning. Please give us some "scientific" light on this subject, and thereby gratify the ears of your half million readers.

C. B.

Lyons, Iowa.

[We regard the subject of our correspondent's communication as of more importance than the levity of his style would seem to imply. All who have ears to hear, whether they understand the principles of musical science or not, are often painfully aware of the discomfort of "sweet bells jangled," and wished for a reform. Bells can be founded of any required tone, and where one society cannot afford a chime, several uniting could procure a peal; and when the towers and steeples gave out their voices on a Sunday, harmony instead of discord would be heard. The principal obstacle to this result would be the unequal burdens it would place upon the different societies, as the deeper the tone of a bell the heavier and more costly the bell must be. A union of the churches on this point, however, would remove this objection.—EDS.

Musical Vibrations.

MESSRS. EDITORS:—As answer to Mr. H. W. C., of Newark (see page 387, Vol. XVII.), it may serve that the musical tone produced by squeaking or chattering of lathe tools, or any other contrivance, is actually used to determine the velocity of vibrations, rotations, etc. When the tone produced corre-

sponds with C, the lowest tone of the violincello, it gives 64 vibrations in a second, an octave higher, 128, another octave higher, corresponding with the lowest tone of the flute, 256; again, one octave higher, corresponding with the highest C of the tenor voice, 512, and another octave higher, being about the highest C of a soprano voice, 1,024 vibrations in a second. The slowest vibrations the ear can distinguish as a tone are those of which the number in a second is 16; they are produced by a large organ pipe, 32 feet long. V.

Heat Shadows—A Question in Natural Philosophy.

MESSRS. EDITORS:—There are among the readers of your paper large numbers of thinking, philosophic minds, and I must thank some one or more of them to give me a solution of the following problem:

The action of heat in producing vibrations of air about a metallic surface, as often seen in a common stove, is well known and has been observed by every person. An ordinary Russia iron stove standing in my office upon a floor covered with oilcloth of a color or shade which rendered the whole thing apparent, and in a proper position when the sun shone upon it, showed the vibrations of heated air as shadows on the floor; in other words, the light of the sun falling upon the stove produced not only the shadow of the stove on the floor, but also of the heated air, as it rose and vibrated about the sides and the pipe. The whole thing was too plain to admit of a mistake, and besides that, it has been observed a number of times, and I suppose, of course, it can be demonstrated at any time by actual experiment.

Now the question is, What was this the shadow of? You may produce vibrations of air by any method or means which can be conceived of, but you cannot get the sun to make shadows of your vibrations.

It is not, perhaps, a question of much moment in science or philosophy, but rather one of those phases of nature which arouse the curiosity and ask for a solution to gratify the mental powers of man. GEO. A. SHUFELDT, JR.

Chicago, Ill.

[Our correspondent is evidently in error in supposing that the vibrating shadow he noticed was the shadow of the heated or vibrating air. No shadow is a well defined image of the substance. All shadows shade off at the edges and produce an indistinct outline. Air is as transparent as any substance with which we are acquainted. The reflection and refraction of light produce some very curious optical effects, due wholly to the different mediums through which the image of the shadowed object is projected. If the medium is in a state of transition from dense to denser, or *vice versa*, the shadow will partake of these changes.

The laboratory of our chemical editor is opposite the assay office of the United States Treasury in this city. A tall chimney rises from the building and sometimes casts its shadow through the windows of the laboratory across the floor. An intense heat is kept up in the furnaces below, which culminates at or near the chimney top. While the lower part of the chimney projects a well defined shadow, the upper portion, where the heated gases escape, gives a tremulous shadow, making the outlines of the chimney, or the upper part, indistinct.

Now this may be accounted for on two hypotheses: either on the different mediums through which the sun's light is passed, owing to the changing conditions of the atmosphere caused by the variations of temperature; or by the rays passing through glass, which is never perfectly transparent and never mechanically perfect. The latter is probably the cause of our correspondent's air shadow.—EDS.

Solution of the Triangle Problem.

MESSRS. EDITORS:—In your paper for January 4, 1868, I notice under one of the headings, "Solution of Plane Triangles;" the writer states that he has sought for this solution for some fifteen or twenty years; signed Justus F. Hoyt, New Canaan, Conn. Among my very early investigations of trigonometry, in a little book called "Flint's Survey," published in the city of Hartford, in the state of Connecticut, in the year 1825, by Oliver D. Cooke & Co., on page 35, case 6, I found the long looked-for problem so clearly worked out by arithmetic, and in so simple a manner, as now to puzzle me for a reason why it has been overlooked. The proposition is: As the sum of the base or longest side is to the sum of the other two sides so is the difference of those sides to the difference of the segment made by a perpendicular let fall from the angle opposite the longest side.

CHARLES S. CLOSE, City Surveyor.

Philadelphia, Pa.

[Our correspondent's idea will be sufficiently clear without the presentation of his diagram or examples.—EDS.

A. D. B., of Connecticut, says, on the same subject:—I would like to call attention to an article in the SCIENTIFIC AMERICAN, of January 4th, entitled "Solution of Plane Triangles." The writer states that "he gives a solution which has never been in print, and which he has sought for some fifteen or twenty years, and thinks that in all probability it will be, sooner or later, introduced into the common school arithmetic." I am unaware of the extent of his researches on the subject, but if he will refer to Euclid, Legendre, or any elementary work on geometry, he will find his problem stated and proved in a much more elegant manner, and much more "worthy to stand next to the forty-seventh problem of Euclid," than his own demonstration. In regard to its ever appearing in the "common school arithmetic," I think he will most likely hunt fifteen or twenty years longer with no better result.

In Prop. XII., Book IV., of Legendre's Geometry, it is proved that, in any triangle, the square of a side opposite an acute angle is equivalent to the sum of the squares of the base and the other side, diminished by twice the rectangle contained by the base and the distance from the vertex of the acute angle to the foot of the perpendicular let fall from the vertex of the opposite angle on the base, or on the base produced.

Answer to the Questions on the Day Line Matter.

MESSRS. EDITORS:—In reply to questions proposed by Mr. Thayer, page 387 of Vol. XVII., I state:—

1st, A man will, when going west round the globe with the sun, on Monday noon, pass suddenly from Monday noon to Tuesday noon when passing the meridian 180° west of Greenwich or 106° west of New York.

2d, When it is Monday noon in New York it is Tuesday morning, 42 minutes past midnight, in Pekin; and when it is Monday noon in San Francisco, Cal., it is Tuesday forenoon in Japan.

3d, When it is Monday noon in New York it will be Monday afternoon for all places less than 180° east, and Monday forenoon for all places less than 106° west; for the rest of the earth it will be Tuesday morning.

4th, The point when it is Monday on the entire globe is when it is 12, noon, at Greenwich; twelve hours later, when the sun is 180° west of Greenwich, it will be Monday afternoon on the western hemisphere and Tuesday forenoon in the eastern hemisphere for all places less than 180° east of Greenwich.

5th, There is a meridian on the globe where the days begin and end, and as mentioned above, the one generally adopted is 180° west from Greenwich, in the Pacific ocean. However, it has been suggested that this line would be better placed 10° more east, as then it would not cross the Asiatic continent, but pass through Behring's strait.

6th, The cause that has fixed this point is that the Atlantic coast of Europe during the time of all the great geographical discoveries, was the focus of travel and commerce, consequently the American as well as the Asiatic continents count their days with Europe. Therefore Sunday noon on the Atlantic coast of Europe is Sunday for all the world; a few hours later eastern Asia leaves its Sunday and gets Monday morning. The beginning of this day will progress over the earth 180° behind the Sunday noon; and the portion of the earth enjoying Sunday will grow smaller all the time till the sun has reached again the meridian of Europe's Atlantic coast when the last remnant of the Sunday has disappeared in the Pacific ocean, and made place for early Monday morning.

At present the islands in the Pacific in proximity to this so-called day line are only inhabited by savages who do not care whether it is Monday or Tuesday, but after civilization shall have penetrated there, a difference in counting the days must spring up between them, it is true not as great as that between the Gregorian style and the Julian (still followed in Russia), but which cannot as easily be rectified, namely, those who count their days with Asia will always be a day ahead of those who follow America. At present vessels sailing west and doubling Cape Horn for New Zealand are, when arriving there, a day behind in their reckoning, as the settlers in this new colony follow with Australia the reckoning brought from England around Cape Good Hope by vessels sailing east.

P. H. VAN DER WEYDE, M. D.

Condensation in Marine Engines.

MESSRS. EDITORS:—In the article on "Surface Condensation," in the "SCIENTIFIC AMERICAN," No. 25, Vol. XVII., it says "the water blown off is 120°." This should have been, the temperature of the feed-water is 120°, I think, which, by the bye, is rather a high temperature, and if surface condensation does not bring it lower than that, it is not very economical. Being an old steamboat engineer, for the benefit of the inexperienced allow me to say, that as the boiling point of water rises 1° for each addition of 2·6 per cent of salt, the water drawn from boiler and boiled in the open air will show a temperature as many degrees above 212° as 2·6 is contained in the percentage of salt in the water. Thus—if it boils at 216°, then 216°—212°×2.6=10.4 per cent in the boiler. A little practice will enable the intelligent engineer to know exactly the amount of salt in the boiler, by the degree to which a hydrometer or a salinometer is immersed.

I would also call attention to the great utility of completely draining the condenser by the air pump. In the *Amphion* frigate, that was sold to the Confederates, and became the *Rappahannock*, there were always 10 cubic feet of water left in the condenser, in consequence of which 20 inches was a good vacuum, for the temperature of the condensing water was that of the union of these ten feet with the amount required from the sea. She was a standing reproach to any engineer. On the contrary, the *Wildfire*, at Sheerness, had her condenser well drained, and the barometer stood at 28½ to 29 in. Having had occasion to take her slides out, after being refaced by the workmen from Woolwich, I would observe, that to get the slides tight it is only necessary to use discretion in taking off the bearing places with a second cut file; for when cold, the slides, and other articles working in a high temperature, may be as true as possible, but when heated become leaky or too tight. From this cause, too, the inaction of safety valves arises very often, the spindle or other appurtenance has been too nicely fitted in the shop, and by expansion when heated sets fast. Trifling as this may appear, it has in more than one instance led to a boiler explosion.

Many things conspire to cause foaming in a boiler, but some of your readers may find it useful to know that some vessels will steam easier—i. e., less fluctuation—and foaming be avoided by increasing the steam space, or working the water in boiler as low as possible. An engineer must allow nothing to be mysterious about his engines, but be as restless as a mother till she finds out what is the matter with her child. If the boiler gives out, and *he knows* a block of wood applied there will enable him to continue his voyage safely, let him apply it, and laugh at his detractors at the end of the voyage. An engineer should at all times know the greatest amount of water he can pump out of his ship in an emergency, and, indeed, more of everything in this department than the captain or any one else in the ship.

Having seen a boiler, by careful blowing off and working at 216°, kept for four years without a scale thicker than a cent, I have not the highest opinion of the economy of surface condensation. Some of your readers may be amused to hear that I have seen scale twelve and eighteen inches thick, the result of negligence in not blowing off. N. C.

Nashville, Tenn.

New Glacial Theory.

MESSRS. EDITORS:—It is with extreme anxiety and delight that weekly, for these many years, have I studied and poured over the scientific contents of your highly interesting and valuable journal, and often have I indulged in the ambitious desire of becoming an occasional contributor, but my wish has hitherto been entirely in vain: nor would I now attempt to ask for a place for this article in your pages, were it not that I am ignorant of the scientific gentleman's address, who on page 370, Vol. XVII., contributed an article on the Glacial Epoch. To him I more especially address the few following remarks. With true becoming grace and modesty, this gentleman inquires, "If the cause assigned by Mr. Reed (page 341, the precession of the equinoxes) be sufficient to produce the Glacial Epochs," as is represented or held forth by that gentleman? I, as an individual, think not, and like Mr. Morley, I question if such cause could produce such a result? I am inclined to support Mr. M., because he has not only put the question, but has at the same time advanced much valuable and substantial evidence to the contrary. If you would be pleased to indulge me thus far, and if Mr. M. would be pleased to give the few following remarks his consideration and study for a few moments, I feel satisfied that not only he, but also all the scientific world, will find, at least, a truer, if not the absolutely true cause, of all the glacial epochs that ever the earth saw, or ever will see. I copy from the "Hepburn Theory" (a small book on Mechanical Astronomy, I am endeavoring to prepare for the press) as follows:

Unfortunately for science and the astronomic world, too much reliance and dependence has been placed in the supposition of Newton and in the theory of La Place; Newton supposed that the combined attraction of the sun and moon acts less powerfully upon the poles of the earth than upon her equator, resulting in the production of a westward gyratory wabble of the poles, and of course of the whole earth. He went further; he concluded that this westward wabble (so called) of the poles, was the true cause of precession. He was entirely wrong; the combined attraction of the sun and moon produces mutation only, nothing more. If the westward wabble of the poles produces precession, how could Newton in his day, or how can his Newtonian disciples in the present day, account for the westward motion of the sun? If the westward wabble of the poles produces an apparent eastward motion of the stars, why is it that such motion in the poles does not at the same time produce an eastward apparent motion of the sun? I say, if the westward "wabbling" motion of the poles was the cause of precession, those poles, in passing by the stars, would as surely and as truly pass by the sun; and I challenge the Newtonian school to show it otherwise. The true and only cause of precession, rather recession of the equinoxes, is nothing more nor less than the westward motion of the sun. The sun moves west in its orbit, by which motion he carries the earth and all the other planets along and around with him, by virtue of which motion the stars appear to move gradually eastward, not only to the inhabitants of the earth, but also to the inhabitants of all the other planets, while at the same time the sun virtually moves westward round the earth and all the solar train; so that recession is not at all peculiar to the earth, but is alike common to all the solar host. That is, I say, the true and only cause of recession, and I challenge the entire astronomic world to advance one single word tending to its refutation? Who will undertake to do so?

Again, La Place's theory was, "that the equator of the earth never did, and never could coincide with the plane of the ecliptic," but that the earth, as it were, rocks or rolls to and fro, within certain very narrow limits, say two or two and a half degrees, and that the earth shall therefore constantly remain but little out or in of her present angle, of about 23½° to the ecliptic plane." In all geological research, there has not been a single discovery made that would in the least tend to favor such a rocking idea, but the Hepburn Theory renders a very different opinion, and fully accounts for all the Glacial Epochs. It proceeds by saying, It is well known that the equator of the earth is at present, and has for these many hundreds of years, been coming more and more into coincidence with the plane of the ecliptic, and the rate of this motion, as rendered from the data of those past centuries, gives an average motion per century of about fifty-eight seconds of a degree per century. Supposing this motion to be constant and continuous, as no doubt it is, it will complete an entire revolution in something like two and a half millions of years. Assuming this to be the exact time, the equator will coincide with the ecliptic in about 145,000 years. In about 625,000 more, or in about 770,000 years from now, the poles of the earth will lie in the ecliptic plane. The poles will then be the most extremely hot and cold points on the earth's surface, alternately. Midsummer day at the poles would be little

short of thirty days of our present time, or about 720 hours of constant and continuous sunshine; and midwinter-night could not be any less than four months, and all that time almost without the shadow of a dawn. Under such circumstances, there could not be any thing else than annual creations of immense fields and mountains of polar ice, and as the cold and frozen poles turned round to the sun, what could follow as a pure result but the breaking up and moving along of vast masses of ice? The ice would loosen and break up, first, at and about the equator, and would continue breaking up gradually inward toward the poles. This would have the effect of causing all the ice and drift to move somewhat outward toward the equator, it could never produce an inward tendency toward the poles, and the effect of the sun's attraction upon such fields and mountains of frozen water would be to draw them in the direction at which he would be lying to the earth at the time. This would have the effect of causing the boulders, etc., to be borne a little eastward, while they were at the same time carried outward from the poles. I say eastward during one glacial epoch, but it would have the effect of producing a westward motion during the other, because then the earth would be, as it were, turned upside down. The combined effect, then, of the sun's heat and the sun's attraction, would be to cause a southeast motion to all erratics north of the equator, and a northeast motion to all south of the equator, during one glacial epoch, and at the next succeeding epoch, all objects so borne, north of the equator, would be carried in a southwest direction, and all objects south of the equator would be borne in a northwest direction. And need I say that so far geology has demonstrated the facts? Nor is the "Hepburn Theory" without other evidence. Uranus and her moons, at the present movement, present nearly the position in which I suppose the earth to be in during her glacial epochs. Now is there anything mysterious in the motions of Uranus' moons; while we behold her in Gemini, their motions appear to be retrograde; but could we behold them forty-two years after, when she is on the other side of her orbit, their motions would appear to be direct, like all the other satellites. Uranus, I believe, is therefore now passing through one of her glacial epochs, just as the earth has done and will in due time do hereafter. But the glacial epochs of Uranus must be vast and fearfully magnificent indeed, compared to those of the earth. But leaving them alone, I would say that my theory is, that the earth passes from the maximum of one glacial period or epoch to the maximum of the next glacial epoch, in regular rotation, in a period of about one million, two hundred and fifty thousand years, the approach to and withdrawal from such an epoch being very slow and gradual.

Admitting, then, the orbit of the sun to be the only cause of recession, as I contend, and granting that the counter ecliptic motion of the earth is a real, a constant, and a continual motion, then we have a tolerably clear and distinct basis to rest upon, both in reference to mechanical astronomy and the great and long continued glacial epochs of our globe.

Gloucester City, N. J. JOHN HEPBURN, SEN.

Reform in Warming Public Buildings and Cars.

MESSRS. EDITORS:—In your paper I have recently noticed two announcements which should gladden the hearts of all wishers for the public good, viz.: that in French cars foot pipes filled with warm water are provided, and that the New Haven Railway Company have adopted a similar expedient for heating their cars. It is my impression that sanitary science can be pursued in no worthier direction than in this matter of warming public rooms. We may decry the evil of ill ventillation and a dozen others, but the most deadly wounds are inflicted by cold on those who frequent public places, such as cars, churches, etc. However good our intention to observe the laws of health, we are at the mercy of those who maintain, either through ignorance or unconcern, cars, churches, schoolhouses, etc., without heating appliances disposed properly as modern facilities direct.

It is a principle which I would have distinctly enunciated that all public places having permanent seats should have steam or water pipes laid convenient for keeping the feet warm. Not only is this the best mode of disposing the heating surface, but if economy were to be consulted it is the cheapest. The surface is well distributed in the coldest part of the room, and it is well known that if the feet are kept warm a much lower temperature in the air may be tolerated with impunity. The head does not need warming. With a piece of small pipe in every pew of a church a congregation might be kept thoroughly warm with probably one fourth of the fuel required in warming by air furnaces. Unfortunately we can have little hope that reform in this matter will proceed very rapidly, as the robust men who manage these things cannot see from their stand-point of hardihood, which will bear anything, that any improvement is needed. It would, however, appear that some pocket nerves might be sensitive and that the philanthropic managers of our churches, and the intelligent guardians of our school children might be awakened to this great evil and act accordingly.

H. W. P.

Newark, N. J.

A Question in Hydraulics.

MESSRS. EDITORS:—The weir of a mill dam is 400 feet long between the abutments. When the water in the pool stands level with the comb of the dam, its surface is 8 feet above the surface of the water below the dam. If when a volume of water is running over the weir four feet deep, a sluice should be opened in the center of the dam 50 feet wide and 4 feet deep, what will then be the depth of the water on the comb of the dam, and what the depth on the same line in the middle of the sluice? Will not some one of your numerous scientific correspondents give his solution of the problem, and indicate the principle or formula by which he reaches his conclusion. X.

Pittsburgh. Pa.

Amputation Not Always Necessary.

MESSRS. EDITORS:—The item mentioned under this head on page 5th, current volume, is a corroboration of facts known long ago among experienced surgeons. Old Dr. Hunter, in England, published almost a century since an account of similar results. During a riot where only about one-half of the rioters were arrested, and one-half escaped and succeeded in hiding themselves in a locality where they had to keep very quiet, with little to eat, the serious wounds of the latter were after six weeks, when their hiding place was discovered, in an infinitely better condition than those of the men who had been in the hospital under medical treatment. Dr. Hunter was honest enough to publish these facts and to confess that the usual medical treatment of gunshot wounds at that time was erroneous, and in consequence of this a useful reform was brought about, of which the basis was, to interfere less, and to trust more to the healing powers of nature. Every one who has had occasion to obtain information on this point knows scores of persons who would not submit to the proposed amputation of some limb, took their chance with nature's efforts, recovered, and found afterward the verification of the fact that a deficient natural arm or leg is always better than the best wooden one. No doubt that surgeons, and especially young surgeons, are rather rash in advising and performing amputations; our late war gives ample proof of this assertion. P. H. VANDER WEYDE, M. D.

New York city.

GOODSELL'S IMPROVED CHIMNEY CAP OR COWL.

Smoky chimneys and imperfectly ventilated apartments are nuisances which severely try the serenest tempers; a cure or remedy is an undeniable blessing. The object of the invention illustrated in the accompanying engravings is to furnish an improved chimney, calculated to prevent the escape of sparks and the blowing of wind down the chimney, and also to ventilate every room having connection with its flue.

Fig. 1

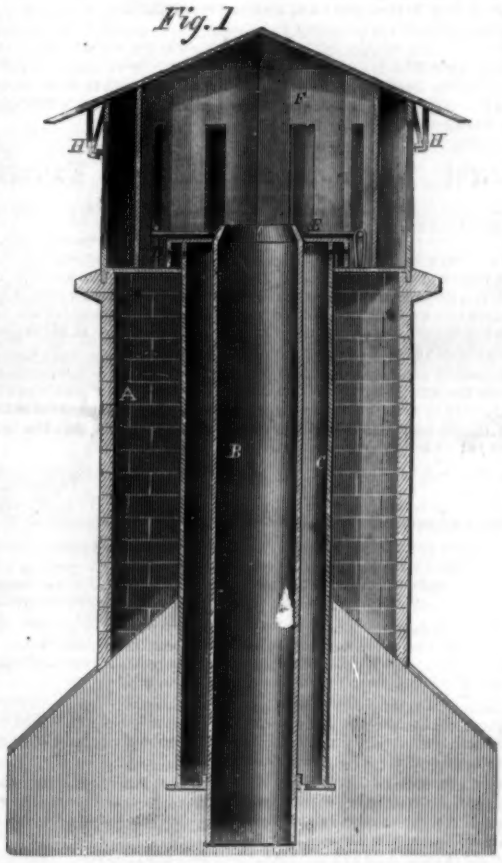
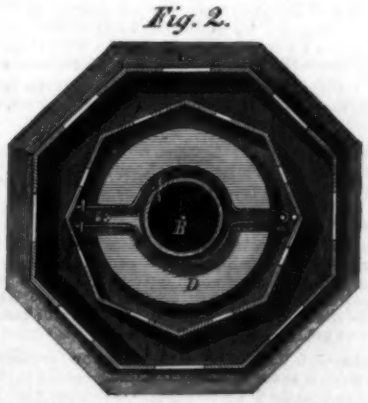


Fig. 2.



A is the chimney and B the smoke flue, into which the flues from the different fireplaces may lead. Its upper end extends to a little above the top of the chimney. Surrounding this flue is the ventilating pipe, C, having openings at its lower end, which terminates at the ceiling of the room. Through these openings the impure air escapes. D is a cap having a hole through the center, the sides of which embrace the upper end of the pipe, B, and hold it in place. This cap has holes in its sides, seen in Fig. 1, by which the impure air in pipe, C, may escape to the chimney, the pipe being similarly perforated. The cap, D, rests upon a plate forming the top of the chimney, and is secured by means of a yoke, E, the open ends of which are sprung under hooks, the other end being held by a staple. F and G are two caps attached to the top of the chimney. They are of polygonal form and so arranged that the angles of one cap face the plane surfaces of the other. The sides of each of the caps are slotted, each slot in one cap being opposite a closed angular space in the other. It is thus impossible for the wind to blow the smoke down the chimney. The whole is covered by a conical cap attached to the side walls by the clasps, H. This form of cap is intended to act as a spark arrester and compel the sparks to drop back on the bottom plate.

Patented through the Scientific American Patent Agency, Nov. 19, 1867, by Bennett J. Goodsell. For further particulars address Goodsell Brothers, Pentwater, Mich.

Manufacture of Ivory Combs, Piano Keys, etc.

A correspondent of the Hartford *Courant* furnishes that journal with the following account of the above manufactures, at Deep River Ct. where the business is carried on very extensively. Indeed the two factories in this village and one at Center Brook, in the same town, are the only establishments in the United States where these goods are turned out.

The factories of Pratt, Reed & Co., located on the road to Chester, are owned by the same company that manufacture under the same name in Meriden. The company is a consolidation of three rival concerns that united under this name in the year 1863. It has a capital of $175,000. The buildings in Deep River are located on a lot of eight to ten acres. This and the Meriden establishment combined makes this the largest concern of the kind in America. In Meriden are manufactured the melodeon key boards and the ebony sharps for pianoes and melodeons. The company now employ some seventy hands at Deep River.

The elephants tusks are purchased by this company from importers residing in Salem, Mass., and Providence, R. I., to whom most all the ivory that reaches this country is consigned. The price paid has ranged from two-fifty to five dollars per pound, and now stands at about three dollars per pound. As this concern alone uses 100,000 pounds of ivory per annum it will be readily seen that elephant hunting may be as profitable as it is said to be exciting. The tusks received vary form six to nine feet in length, the former being about the average. They have been found weighing ninety pounds, though the average is but seventy pounds. The tusks are hollow in the center up to the point where they grow out of the heads, while a small nerve runs clear to the tip of the tusk.

The first operation is "junking," when the tusk is sawed into semi-circular blocks and again sawed either into the length of a comb or of a piano forte key, as may be required. The outer "bark" that encrusts the ivory is then hewn off, when the blocks are marked with a lead pencil as required, according to the size of the combs. A fine saw, carefully watched, then cuts off the strips for combs. For piano forte keys the junks are hewn on a machine, and then a split saw cuts them into blocks, whence they are again sawed into the required sizes for "heads" and "tails." Of the combs, the ends are next rounded, and the ivory partially dried in fire clays, so that they can be turned in the ivory planing machine invented by this firm. A very neat sorting machine next sorts them into sizes of from one, two, to four inches, and deposits them in boxes which are revolved by an endless leather belt. The combs, after being planed and sorted, are bleached in the bleach houses (alluded to hereafter), and then polished on a smooth wheel on which a cotton cloth with some unknown dressing (which has been substituted for buck skin) has been placed. The wheels have to receive this dressing after each three dozen combs have been polished. The combs are then sized, when comes the most delicate operation of all, sawing the teeth. This is done with imported saws most finely tempered, and as thin as the thinnest paper—so thin that they cut from forty to seventy teeth to the inch. Though the same are imported, their teeth are cut by the company's mechanics, and most delicate workman they have to be. The combs are then dampened, when they are pointed on a very curious machine with very rapid motion. This completes the combs, which are then packed up according to their sizes. The piano ivory after being sawed into heads and tails, as spoken of, are soaked, next washed off by hand, then put into trays and taken to the bleach houses, which are constructed like long green houses. The trays are hung up directly under the glasses, where the ivory is exposed for from eight weeks to six months, according to the weather and sunlight. The combs are exposed in this way after being sawed, for from four to five weeks. The combs slide into the trays, while the piano forte keys are held by pins. After one side of the ivory is thoroughly bleached the trays are reversed, and the other side exposed. The bleach houses are five in number and very large, from 160 to 600 feet long. One of them, however, is used as a lumber storehouse. Of late years this company have manufactured its own piano forte key-boards. Of frames for these they manufacture ten different styles for as many different piano forte manufacturers, embracing some of the most prominent in the country. For one firm alone they make 100 sets per month. In this department of the factory is a very neat machine for morticing and broaching. In these frames are used black walnut, cherry, pine, and some ash. The key-board itself is of pine, except the front and back slips, which are of bass wood. Next to the frame making and cutting, comes the board fitting. The ivory laying is

next done, then the "lushing," which last operation is only gone through with when desired. The manner of it is as follows:—The front of the key-board is in front of the operator, with the mortice in which the pipe plays directly before him; into the mortice he forces a little silk cushion to prevent a rattle. The key-board is next placed in a machine which throws a very fine white oily dust, which would do admirably for snow in amature theatricals. The sawing operation necessary to separate the different parts of the key-board are next carefully prepared, and the edges of the keys filed, after which the sharps are separated from the keys and buttoned. The keys are next put on the frame and squared. The ebony sharps (made at Meriden) are then put on and the whole wiped off and balanced. The final operation is to fill the edges and "ease" the boards, which are then ready for the market.

The piano forte key-boards are made entirely to fill orders. This department of the business is but a few years old. Of combs this firm turns out 500 dozen a day here and the same number at Meriden.

Editorial Summary.

Removal of Organic and Inorganic Substances in Water.—On page 24, last volume, we gave the substance of a paper on this subject, read by Mr. Edward Byrne, member of the Institute of Civil Engineers, before that body. This gentleman, in continuing his experiments, has just presented in another paper to that Society, some later results of interest. Using as filtering materials, magnetic carbide, silicated carbon, and animal charcoal, he found that the former had but little effect in softening water, whereas this property was possessed in a high degree by both the others, although silicated carbon, after being effective for a time, finally rendered water harder than before. Charcoal after removing impurities from the water for a certain time, then began to give back a portion of the organic matters, while silicated charcoal in about the same time returned not only the organic, but also the inorganic matters. By employing Prof. Wanklyn's delicate tests, it was proved that in its percolation through these filters, the organic matters, at least nitrogenous ones, were not oxidized. The author, in concluding, recognized the value of filtration for clearing water of matter in mechanical suspension, but found it practically useless for removing substances in solution.

Hight of Mount Hood.—A Californian correspondent referring to an article on this subject, in our last volume, sends us the report of Lieut. Col. R. S. Williamson, of the United States Topographical Engineers, who, last summer, ascended the peak and made much more careful observations, and hence obtained more accurate results than any previous observer. His instruments consisted of cistern barometers graduated so as to read to the 1-2000ths of an inch, and wet and dry thermometers easily reading to tenths of a degree. At the summit the barometer, estimated for a temperature of 32° Fah., stood at 19·941 inches. Making the necessary computation, the hight of this peak was found to be 11,225 feet, an elevation far below what has hitherto been accepted as the true one.

Engineering Achievements.—In laying out the line of the London Metropolitan Railway, the tunneling, in some cases passed under massive houses, and frequently this was done without causing a crack in the walls. In one case the arch was carried up so that now its top forms a kitchen floor. Other feats in engineering, which have been achieved, were cutting across eight or ten feet sewers, and replacing them without stopping the flow more than a few minutes; and in one place, carrying a branch railroad under the underground one, thus making a sub-subterraneous road; diving like a whale, and coming up again to breathe under Smithfield market, for whose use this was built to bring in the "dead meat" for London's hungry millions.

The Mission of Meteors.—The uses of these starry visitors to our sublunary sphere has at length been discovered by a French *savant*, M. Dufour. From a careful study of the motions and effects of meteors, he has found, among other things, that these bodies scatter promiscuously in their course a peculiar dust of oxidized meteoric matter, consisting principally of phosphorous in a decomposed form but combined with other elements essential to the growth of plants. M. Dufour has calculated that the annual deposit of this fertilizing material is equal to about two cubic yards per acre of the earth's surface.

An Unbroken Telegraphic Circuit was made, and messages were sent, on a Sunday night, last month, from Houston, Texas, to Helena, Montana. Telegrams between these places went *via* New Orleans, Mobile, Knoxville, Washington, New York, Chicago, and Salt Lake City, and the entire length of route was 4,786 miles. Had the San Francisco operator not been out of the office, he would have been drawn into the circuit, and the length extended from Salt Lake City a thousand miles more. The weather was very favorable and the wires were in good condition.

In hardening and tempering steel too much care cannot be exercised to have proper fuel. A green coal fire—bituminous coal—such as is fit for taking a welding heat on iron, is entirely unfit for hardening purposes. The sulphur contained in the coal combines with the steel to form sulphuret of iron and ruins its texture. A clean charcoal, anthracite, or a coked bituminous coal fire is required.

Manufacturing, Mining, and Railroad Items.

As a result of the late Angola tragedy, our exchanges abound in editorial suggestions and the communicated views of correspondents, concerning reforms in railroading. Space would fail to note all these different plans proposed, some having real merit, and others being the hight of absurdity. The latest one that has come under our notice is a proposition for making the roofs of the Monitor cars some light structure, and only slightly fastened to the main body of the car, so that in case of overturning an escape for the imprisoned passengers might be opened. New methods for heating the cars have become a special subject of attention, and the introduction of the plan in use on European railways is strongly urged in some quarters. In these carriages, stoves are entirely dispensed with, and their place is supplied by tin tanks of hot water, encased in some non-conducting material, let into the car floor in front of every seat, upon which to place the feet. At regular stations the hot water is renewed. In going from London to Liverpool but one, and from London to Edinburg but two such changes are made.

We find in a Canadian exchange an interesting account of a silver mining region discovered the past year on Thunder Bay, north shore of Lake Superior. An American company was first in the field, and have enjoyed an almost exclusive monopoly since. The ore consists of native silver and the black sulphuret, argentiferous galena and leaf silver. The yield of the working ores has been at the rate of $700 per ton, and with this encouragement several other companies have commenced operations within a few months. Our authority believes this to be one of the richest silver regions in the world, either on the old or new continent.

The first half mile of the experimental elevated railroad in Greenwich street is fast approaching completion. Its constructors seem confident that the line, when finished, will be accepted, and its continuation to the Central Park authorized. We learn that a company has been formed to build another elevated road through the city, upon a plan of Mr. R. Montgomery, who uses corrugated iron for the beams and supports. He asserts that he can complete a durable track from the Battery to Union Square in ninety days.

The Candee rubber factory, at New Haven, Ct., turns out two thousand pairs of rubber boots and shoes per day. The machinery of the establishment is said to be valued at $500,000.

Statistics from the official reports of the Government mines inspectors, show that last year in the coal mines of England, Scotland and Wales, one human life was sacrified for every 67,877 tons of coal raised, and one death took place in every 216 colliers employed. The gross total of accidents last year was an increase of 20 upon 1865, but the increased number of deaths was out of all proportion to the increase in the accidents. In six accidents arising from explosions of fire damp, 526 men and boys were killed.

Although comparatively little capital is invested in the lead mines of Dubuque, Iowa, the local papers of that place state that the yield for the year is from four to four and a half million pounds, of which 830,000 pounds have been taken from the Kelly lead. This mineral has yielded 45,000 pigs of lead. The average price of the mineral for the year has been about nine cents, making the total product of the mines over $360,000.

Influential parties in Connecticut are organizing to secure, from the next State Legislature, the extension of the New Haven and Derby railroad to the Hudson river, there to connect with a road to be built by a company already formed under the general railroad law of this State, through to Erie. From New Haven the course of the old air line will be followed, through Willimantic, Ct., to Boston.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Artificial Embankments.—J. C. Schooley, New York city.—This invention consists in constructing a core or spiral column within an earthen dyke or levee, above or below the natural surface of the earth, and is formed by pouring into a prepared channel any suitable liquid material which will become hardened when cooled, thus forming a continuous line of impervious wall, without open joints.

Railroad Axle Box.—Louis A. Doches, New York city.—This invention relates to a journal box for railroad axles, and its object is to prevent the waste of oil or other lubricating material, to keep the dust from entering the box, and to make the lubricating device self-indicating, so that the deficiency of oil can be ascertained at a glance.

Binder for Shingles, etc.—C. B. Martin, Fond du Lac, Wis.—This invention relates to a binder for shingles, laths, staves, and other similar articles to which it may be adapted, which binder consists of wires; in combination with a wooden band or bands.

Machine for Separating Wheat from Garlic.—Samuel Gantz, Beaver Creek, Md.—This invention is a simple, compact, and cheap portable machine, operated by hand or other power, by means of which wheat can be thoroughly and easily cleansed from garlic, rye, and other similar impurities.

Weather Board Hook.—John Nester, Portland, Oregon.—This invention consists in an improved form of weather board hook, in combination with a fluid level, graduated rule, marker, and gage, the whole constituting a carpenter's combined tool, of great utility and convenience.

Beehive.—David Shaeffer and Aaron McCabe Shaeffer, Centerville, Iowa.—This invention contains a new device for protecting the honey from the approach of moths and millers, and a new and improved arrangement of the several parts of the hive.

Tumbler Washer.—E. Walton Russell, Baltimore, Md.—In this invention a jet is closed at its top by a plug valve seating upward, which closes by the force of the water. The valve rod projects from the top of the jet. When an inverted tumbler is placed over the jet its weight opens the valve and a shower of spray is thrown into the tumbler until it is removed.

Gate.—Isaac N. Young, Swan, Ind.—This invention is designed for a farm or road gate, and is made to be opened or closed by persons in carriages without the necessity of their getting out of the vehicle.

Horse Hay Fork.—John Gilmore, Phœnixville, Pa.—In this invention a new device is employed for opening, closing, and locking the jaws of the instrument, whereby greater convenience and efficiency of operation is secured.

Pruning Shears and Hedge Trimmers.—Joseph Sill, Montuesville, Pa.—In this invention one jaw is provided with a socket which fits to the rod to be cut, and enables the knife to pass through the wood at an acute angle with its grain, thereby greatly facilitating the cutting of stout shrubbery.

Kite.—E. J. Hughes, Pittsburgh, Pa.—This invention relates to an improvement in kites, and consists in making them in the form of birds, with a peculiar method of attachment and arrangement of parts.

Hasps and Hooks for Gates and Doors.—Wm. Bisbee and Fleming G. Hearn, Yreka, Cal.—This invention relates to an improvement in hasps and hooks for gates and doors, intended to meet the shrinkage of timber which takes place during long continued dry weather and the swelling consequent on continued rains.

Field Threshing Machine.—A. W. Tucker, Waxahachie, Texas.—This invention relates to a new thrashing machine, which is arranged upon wheels, so that it can be drawn over the field, after the reaper has moved over the same, and so that it will rake up all the straw laying in its track, and will thrash the same and discharge it, while it will retain the grain which has been freed from the straw.

Sled Brake.—J. L. Heffron, Marathon, N. Y.—This invention relates to a sled brake which is so arranged that it will only operate to retard the motion of the sled when the sled is crowding on the horses, while it will be out of the way when the sled is drawn ahead or when backing.

Machine for Making Peat or Clay into Blocks or Bricks.—Eliphalet Hall, Clinton, N. Y.—The wheel at and around its periphery is divided into a series of molds of uniform size and shape and at equal and regular distances apart. These molds are formed by the concentric rings to the wheel, joined together by the cross and radial partitions.

Distilling Apparatus.—H. G. Dayton, Maysville, Ky.—This invention relates to a new distilling apparatus, and its object is to effect a slow and gradual distillation to separate the fine spirits from the fused and bad spirits

Combined Cultivator and Seeding Machine.—Castle Churchill, Cedar Falls, Iowa.—This invention relates to a new and improved cultivator, and seeding machine combined, and consists in a novel construction and arrangement of parts, whereby several advantages are obtained over the ordinary implements of the kind in use.

Plow.—A. N. Moore, North Cohocton, N. Y.—This invention consists of cutting knives or scrapers attached laterally to the plow share at a short distance above the plow point, together with lateral wooden wings, and carved corners of the share, for the purpose of delivering off the soil more effectually, and hilling it up against the roots of corn or other vegetation.

Maize or Corn Harvester.—L. B. Hamilton, Boston, Mass.—This invention relates to a new and improved machine for harvesting Indian corn, to wit, cutting the standing stalks, one or more rows simultaneously, and gathering and conveying the same, as cut, to the rear part of the machine where they may be bound if desired, or thrown in proper sized gavels or bundles upon the ground convenient for shocking. The invention consists in the employment or use of revolving cutters constructed in such a form or shape as to operate with a drawing cut. The invention also consists in using in connection with the rotary cutters, fingers, constructed of cylindrical rods having sharp pointed ends, and placed in such relation with the cutters that they will retain or hold the standing stalks while being cut, and assist, in an eminent degree, the work of the cutters. The invention also consists of rotary spiral conveyers placed in such relation with the cutters and fingers, that the standing stalks, as cut, will be carried back in an upright position to the rear part of the machine, where they may be bound or discharged in gavels from the machine. The invention further consists in constructing the body of the machine in such a manner that passage ways will be formed through which the cut stalks can be conveyed with facility to the rear part of the machine.

Apparatus for Delivering Goods.—James D. Sinclair, Brooklyn, N. Y.—This invention relates to a new device for discharging goods from warehouses, or for lowering the same from the upper stories to the ground floor, or to any one of the intermediate floors, as may be desired, and consists more particularly in the construction and arrangement of the traps, which are arranged at the intersections of the inclined ways upon which the articles to be delivered slide down.

Washing Machine.—E. W. Dixon, Forest Grove, Oregon.—This invention relates to a new and improved clothes washing machine, of that class in which a swinging or oscillating pressure block or head is employed. The invention consists in a novel manner of constructing said pressure block or head, the arrangement of the handles or frames attached thereto, and a novel manner of constructing the interior of the suds box, whereby several advantages are obtained.

Stump Extractor.—James Elliott, New York city.—This invention relates to a new and improved device for extracting stumps, more especially small or medium sized stumps, such as those of the scrub oak, etc. The object of the invention is to obtain a device for the purpose specified, which may be operated with the greatest facility, and admit of stumps being extracted very expeditiously.

Cultivator.—S. G. Peabody, Champaigne, Ill.—This invention relates to a new and improved cultivator, constructed principally of metal, and so arranged as to be capable of being used either as a single or double implement. The invention consists in a peculiar construction of the device, whereby a very strong, durable, and efficient implement of the kind specified is obtained, and one which may be readily adjusted to be drawn from place to place.

Plow, Potato Planter, and Seeding Machine.—Solomon Shetter, New Cumberland, West. Va.—This invention relates to a new and improved combination of a plow, potato planter, and seeding machine, and it consists in the employment or use of an endless carrying apron, operated from a traction wheel, and arranged and applied in connection with a hopper, plow, and a covering share, whereby seed potatoes and other seed may be planted expeditiously and in a thorough manner.

Traveling Bag.—Zachariah Walsh, Newark, N. J.—This invention relates to a new and improved manner of attaching the cloth or fabric, of which the sides of the traveling bag is composed, to the jaws or frame of the bag, whereby a very secure and cheap connection of those parts is obtained; and it further consists in an improvement in the construction of the jaws of the frame whereby the latter is prevented from cutting or chafing the cloth or fabric of which the sides are composed.

Dining Table.—Manuel Pitz, East New York, N. Y.—This invention relates to a novel application of a revolving dish holder to a dining table, whereby any one of the number of persons seated at the table may, without any difficulty whatever, help himself to any article of food on the dish holder, and without disturbing any of the company at the table, the invention also admitting of a table cloth being used, a result not hitherto attained with revolving dish holders.

Hand-Loom.—H. H. Mitchell, Mineral Point, Wis.—This invention relates to improvements in a hand-loom, and consists in attaching a cord and weight for regulating the movement of the yarn-beam, in the place of the lever arrangement in the improved hand-loom for which letters patent have been granted to J. W. Hayse, and also in placing weights on the treadles, together with iron screw-pins or tappets in the rollers.

Increasing the Sonorous Quality of Wood for Sounding-Boards.—Wm. H. May, Bridgeport, Conn.—This invention relates to an improved mode of preparing wood to increase its sonorous quality, to be employed for sounding-boards and other parts of piano-fortes, violins and other musical instruments.

Machine for Cutting Out Boiler-Tubes.—W. Bell Smith, Charleston, S. C.—This invention relates to an improvement in a machine for cutting out the tubes of steam boilers, and consists in a hollow mandrel secured to the flue-sheet of a tubular boiler by a shifting clamp and bolt, within which mandrel is fitted a self-feeding sliding cutter bar, the head of which carries the cutter on an incline or wedge that moves forward to force the cutter out and give it its feed motion by means of a fixed nut working in a screw on the outer end of the cutter bar, the whole being constructed and operated by gear or friction wheels with a hand crank.

Reel for Reaping and Mowing Machines.—William F. Rundell, Genoa, N. Y.—This invention relates to an improvement in the construction of that class of reels for reaping and mowing machines which are not provided with a central shaft, and it consists in a novel way of constructing the reel, whereby the parts are firmly secured together without the aid of oblique braces hitherto used, the reel rendered capable of being readily put together and taken apart, and a smaller reel than hitherto allowed to be used, by which the team may be hitched nearer to the frame of the machine than usual.

Attaching Ornamental Heads to Nails, Screws, etc.—Thos. C. Richards, New York city.—This invention relates to a new and improved mode of attaching ornamental heads to nails, screws, etc., whereby said heads may with the greatest facility, be applied to the screw or nail after the same has been driven or screwed in a wall or other fixture. The object of the invention is to obtain an economical means for effecting the object, as well as one which will admit of the ornamental head being adjusted expeditiously on the nail or screw.

Gunpowder Canister.—Olin Scott, Remington, Vt.—This invention relates to a method of constructing canisters for containing gunpowder, and it consists in forming the same of tin or other suitable metal of a hexagonal or similar form, with corrugated sides and heads, and in securing the heads in the canister by seams or otherwise.

Marine Governor.—Edward M. Troth, New York city.—This invention consists in the use of a pendulum, which is connected with the slide valve of a steam chest, so that when the pendulum is brought out of its vertical position, and swings toward the bow of the vessel, it will operate the slide valve, which will cause the steam to operate upon the piston in a small cylinder, in such a manner that the throttle valve will be closed.

ROTATING CRANE.—John S. Coffman, Greenville, Ind.—This invention relates to a method of constructing cranes, or derricks, whereby they are more easily manipulated and more simply and economical constructed. It consists of a frame, or stand, on the top of which is a revolving windlass and windlass frame, around the axle of which windlass is the cord or rope by means of which merchandise is raised.

BLIND AND SASH FASTENER.—Andrew H. Wemple and Thomas D. Richardson, New York city.—The object of this invention is to provide a cheap and efficient fastening for outside blinds, shutters, and windows, whereby the same are securely fastened by one operation.

LUBRICATOR.—John L. Whipple and Adolphus Bonzano, Detroit, Mich.—This invention relates to a method for lubricating slide valves, cylinders, lift rod and wearing surfaces in other situations.

DRAWING WICKS THROUGH BURNERS.—F. A. Flaetterlein, West Meriden, Ct This invention relates to a device for clamping and drawing wicks through the tubes of lamp burners, and consists in the use of a flattened sheet metal bar, doubled up in the center and provided at one end with teeth for biting the wick, and perforated to pass over the teeth of the ratchet, or wick elevator.

SAFETY ATTACHMENT TO RAILROAD CARS.—Samuel Pennock, Kennett Square, Pa.—This invention relates to a device for absorbing the momentum or shock of colliding railroad cars, and consists in connecting the inner end of the draft bar of each car with a wedge, which rests upon a spring bed. During a collision the draft bar is thrown in, and the wedge is pushed over the elastic bed, depressing the same, and thereby transferring the shock from a horizontal to a vertical line; the crushing of railroad cars is thus prevented, and even the disagreeable shock is overcome.

OAR LOCK.—Michael A. Lanagan, Brooklyn, N. Y.—This invention has for its object to furnish an improved oar lock that will allow the oar to be moved freely in every direction, from which it will be impossible for the oar to escape should it be dropped, in which it may be quickly placed, and from which it may be quickly removed.

DETACHER AND ANCHOR STOPPER.—Michael A. Lanagan, Brooklyn, N. Y.—This invention has for its object to furnish a simple, safe, and effective device designed especially for use as a boat detacher and as an anchor stopper, but equally useful for other purposes wherever it is desired to detach a suspended object.

PORTABLE MILL.—Silas Dodson, Jersey City, N. J.—This invention has for its object to furnish an improved grindstone mill, simple in construction, convenient of adjustment, and which will do its work faster and better than the mills constructed in the usual manner.

WELL TUBES.—Wm. B. Hutchinson, Newbern, N. C.—This invention consists in combining with a malleable, cast, solid-jointed, perforated cylinder, having an oval-shaped bottom, to enable sand to wash or pass out rapidly, a diamond-shaped, perforated, self-discharging, conical or oblong-shaped sand basket, placed within the said perforated cylinder, and provided with a conical or oblong wire-gauze filterer.

PORTABLE FENCE.—A. Labair, Pewaukee, Wis.—This invention relates to an improved portable fence, and consists of a fence of upright, horizontal bars, having a foot or abutment at each end of each length on opposite sides thereof, which may be made of the same lumber as the uprights or horizontal bars.

BAG HOLDER.—C. D. Brainerd, Dansville, Vt.—This invention consists in a novel manner of hanging or arranging two jaws, or arms, for holding the mouths of bags open while being filled, by means of which the jaws, or arms, can be drawn together, or toward each other, to admit of the mouth of the bag being easily placed upon and over them, as well as also to accommodate bags of different widths; the jaws, or arms, when released, immediately springing apart, and thus tightly grasping and firmly holding the bag in its place or position. Also, in a novel construction or arrangement of the bag-holder frame, whereby it can be adjusted and set to accommodate bags of different lengths.

STREET CAR BRAKE.—Jacob Katzenberg, New York city.—This invention has for its object to furnish an improvement in the manner of applying the brake, which shall be simple in construction and effective in operation, and which will allow the brake to be applied with full force by the driver, while at the same time both his hands may be free to manage his horses.

STONE BOAT.—Thomas V. Cook, Lancsboro', Pa.—This invention consists of a cast iron shoe, in proper form, provided with suitable uprights or plank holders, to which are fitted planks or similar supports for stone or other materials, said planks being bolted to the said shoe in such a way as to form a very strong and durable apparatus for the drawing of stone or other materials upon the ground.

BENDING HARNESS AND OTHER IRONS.—Wesley Mallck, Tidioute, Pa —This invention relates to an improved device for bending harness irons.

FIRE-ARM.—L. Conroy, New York city.—This invention consists in a novel arrangement for extracting or removing the waste cartridge shell from the bore of the barrel, which extractor for the cartridge is connected with the breech block of the gun, and operates in conjunction therewith.

CAR COUPLING.—John T. Stoakes, Parish of New Church, England.—This invention has for its object to furnish an improved car coupling, which shall be self-coupling; which cannot become accidentally uncoupled while the cars are upon the track, which will at once uncouple itself should the car or cars be thrown from the track, and which can be easily and quickly uncoupled when desired, even should the train be in rapid motion.

SAW MILL.—Philip Estes, Leavenworth, Kansas.—This invention relates to an improvement in head blocks for saw mills and consists in an open rack and pinion connected with a lever having a clamping eccentric and carrying four pawls and a ratchet wheel having two dogs.

ROTARY FEED FOR SAW MILLS.—James M. Scott, Kinsman, Ohio.—It has hitherto been found impossible to procure a rotary motion from the pitman of a saw mill. This is obtained by this invention and is intended to be applied to feed the mill.

MILLSTONE BUSH.—C. Custer, Philadelphia, Pa.—This invention relates to improvements in boxes for bushing the spindles of millstones, whereby a spindle may be adjusted with perfect accuracy by means of thumb screws and wedges operating in loose wedges lying against the spindle which wedges are made of iron, brass or wood, or may be faced with Babbitt metal, leather, or any other anti-friction material.

CULTIVATOR.—R. Garter, Lowell, Mass.—This invention relates to an improvement in cultivators mounted on wheels and adapted to the working of corn, cotton and other crops and general field work and consists in forming a truck frame inside of the side beams so connected that the frame may be raised and lowered readily for giving more or less depth to the teeth or plows.

TABLE LEAVES SUPPORT.—N. Long, Eaton, Ind.—This invention relates to an improvement in table leaves and consists in an arrangement of the supports in connection with springs, whereby they are rendered self-acting and when the leaves are raised will take their place under them to hold them up in the usual way.

CHILDRENS' CARRIAGE.—A. D. Fowler, Newark, N. J.—This invention has for its object to improve the manner of attaching the fore wheel to the arms of the frame of children's carriages, wheel barrows, etc.

SASH ADJUSTER.—P. H. Hardy, Terre Haute, Ind.—The object of this invention is to provide a substitute of the expensive box window frame in common use by adjusting the sashes with cords and pulleys attached to the sashes and to the frame in anothor and simpler manner, and it consists in so attaching the cords and adjusting them that the sashes shall balance each other.

GATE.—C. H. Platt, North Fairfield, Ohio.—This invention has for its object to furnish an improved gate, simple in construction, durable, and not liable to get out of order and which may be adjusted to swing at a higher or lower level or secured in such a position as to allow sheep or small stock to pass freely beneath it.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. D. M., of Ga.—The Electric Gas Lighting Apparatus manufactured by Cornelius & Baker, of Philadelphia, are very convenient. The appliance is attached to each bracket and by simply lifting an india-rubber plunger which fits inside a cup lined with silk, the electricity is communicated by a chain or wire to the burner. We have the article in use at our home. An engraving of the Eledtric Bracket may be found on page 328, Vol. XI., 1864, or probably Messrs. Cornelius & Baker will send a circular illustrating the invention by addressing them at 712 Chestnut street, Philadelphia.

W. D.—The Patent Reports are not on sale. Apply for them to the Member of Congress from your district. They are printed for public, free distribution by the Members.

C. B., of Pa.—Hemlock bark extract is made by some perating machine, of which several forms have been patented. The special of machine, however, is of less consequence; the principal tools for an economical preparation are proper grinding mills, strong pressure to expel the last and best liquid from the fibers, and kettles, etc., to boil the extract down to a lesser bulk and make it more fit for transportation, for which the bark itself is entirely unfit, and therefore the skins have usually been brought to the bark region being less bulky than the bark required to tan them. There is a market in New York for the extract, but the success of its manufacture depends not in having plenty of bark, but like many other enterprises, mining operations, etc., on a sufficient capital to be invested in proper machinery.

A. M., of N. J., asks for a simple recipe for producing soluble glass, and a composition to coat walls previous to their being papered and varnished. A quite extensive description of the preparation of soluble glass (liquid flint) will be found in one of the last numbers of the SCIENTIFIC AMERICAN of 1866. As to the composition for coating walls we presume that soluble glass will do all that is wanted.

J. F. R., of West Castleton, says: "Explain to me the reason of the change of the atmosphere in the fall of the year. During the day a lead-color haze overspreads everything, but at night as a general thing it is perfectly clear." The color of the sky depends greatly upon the state of the atmosphere, and particularly upon its dampness, which is greater in cold than in warm seasons. We do not mean to say, however, that the amount of moisture in the air is greater in winter than in summer, but in winter the vapor of the atmosphere will condense but at a slight decrease of temperature, while it will not do so in summer. The clearness of cold winter nights is explained by the fact that the moisture freezes and little evaporation is taking place.

W. C., of N. Y., is asking how cascarilla bark is prepared for introducing into matches and tobacco. The odor of the bark resembles that of musk. For matches the bark is reduced to powder, and mixed with the dipping composition. For tobacco a decoction is applied, but it is said to occasion vertigo and intoxication. In medicine this bark was formerly often prescribed as a substitute for Peruvian bark, but it has lost much of its reputation.

G. D. J., of Conn.—"Can you inform me of any ingredient that will render rubber or leather impervious to oil, or anything that can be mixed with oil that will produce the same result. The rubber or leather will be continually in contact with the oil and the object is to preserve them from being destroyed by the oil." The following composition if properly applied will answer your purpose: Dissolve in an iron pot 1 part of finely cut gum elastic in a mixture of 4 parts of linseed oil and 8 parts of "solar stearin," apply gentle heat, and stir in 12 parts of amber varnish when the gum is all taken up.

B. H. L., of Pa.—"Can you give me some information in regard to deodorizing benzine; there is an article in our market that is free from offensive odor." A chemist lately recommended to digest it with a solution of oxide of lead in caustic soda. Try it.

H. M., of Ala., wants to know if there is a good market for hemlock extract and if there are any patents covering machines for its preparations. The extract is not so much in demand as the ground barks tanners prefering the latter. There exist several patents for extracting tannin from the bark, which you will find by referring to the SCIENTIFIC AMERICAN.

W. G., of Pa., asks for information about the manufacture of sulphate of iron from iron pyrites. We do not know of its being prepared directly from them and doubt whether it will pay to do so, as copperas is quite largely obtained as a waste product in the boiling of the crude lye in manufacturing alum.

J. M., of Ala., seeks for information about the preparation of crystallized candy. Prepare a solution of loaf sugar in lime water and boil it down very cautiously until threads can be drawn from it. Transfer then the sirup into broad vessels, cover them well and keep them in a warm room. Crystallization will have set in in a week or ten days.

J. L., of Ind.—"Do you know of an invention for opening, closing, and fastening the upper swing casement of Gothic church windows, to be operated by a person standing on the floor 20 or 30 feet below the top of the window?" We think such contrivances, managed by a cord and spring, are in quite common use. Such a device could be easily contrived.

J. W. H., of Minn., asks the following question of practical millers: Will it take any more power to grind a certain amount of wheat per hour—say eight bushels—on a pair of millstones four feet diameter than it will to grind the same amount on a pair of three-and-a-half or three feet diameter?"

D. S., of N. Y., wishes to have information on setting up stationary engines; more particularly where he is to find the lines for "lining up" an old engine. He wishes a diagram published. The setting or lining up of an engine is so simple a process that it seems puerile to publish diagrams to explain it. The center of the piston, center of the cross-head, and center of crank shaft should be in one line. Usually one or more "spiders" of wood—merely crosses with a hole through the center where the two arms intersect—are fitted to the bore of the cylinder and a line drawn through to the center of the pillow block bearing. Proper measurements and gaging, with an ordinary amount of skill, can do the rest. After all, the practice of the shop is better than the information given through the medium of our columns. There is no royal road to a practical knowledge of the steam engine.

L. D. M., of Tenn., requests a recipe for hardening mill picks to stand on hard burrs. He finds great difficulty in getting a durable edge. The question has already been answered through our columns. We cannot repeat answers an indefinite number of times to oblige a single inquirer. Pallett's "Miller and Millwright" gives the following as a pickle: 5 galls. rain water, 3 oz. spirits niter, 3 oz. hartshorn, 3 oz. white vitriol, 3 oz. sal-ammoniac, 3 oz. alum, and two handsfull of horse-hoof parings; to be kept closed from the air.

J. L., of Ill.—"Take a pulley 4 feet diameter, 8 inches face, 6 arms, weight, 325 lbs., at what velocity will the centrifugal force overcome the force of cohesion, the wheel to be evenly balanced and rotate true on the shaft?" No rule for such a case can be laid down, as the quality of iron varies greatly and the weight may be so distributed in the rim, arms, and hub as to either greatly strengthen or weaken the wheel.

O. A., of N. Y., asks what is better to coat chills for coring castings than shellac varnish or oil. He uses oil and fine sand baked on in an oven. We know of nothing better than his plan. Perhaps some molder may furnish a better recipe.

T. W., of R. I., wishes to know how to lay out the holes through floors for a quarter turned belt. He says the information received through the SCIENTIFIC AMERICAN was not quite satisfactory, and hopes some correspondent will reply. We regard the laying out of belt holes for any sort of belt as a perfectly simple process and have given such explanation as appeared to us to be easily comprehended; but if a correspondent can make it clearer we shall be glad.

R. J. E., of Wis.—"Would the weight on the step of a perpendicular shaft with a large fly wheel be any less when the wheel and shaft was rotated than when at rest; or is the weight on the standard of a governor diminished when the balls are raised by centrifugal force?" In both cases the answer is, No.

O. H., of N. Y.—"If 33,000 lbs. falling 60 feet will work up to one horse-power for one hour, less the friction, will coiled springs that require the same power to wind them up produce the same result?" Theoretically the result will be the same. Imperfection in the springs or the medium of transmission of the power may affect the result, but the principle of the indestructibility of force is consonant with the above statement.

P. D., of Canada.—"You have mentioned that good turbines realize 80 per cent of the theoretical power of the water. Am I to understand that such a wheel with proper appliances would raise four-fifths of the water used in driving it to the same hight as that from which it acted on the wheel?" No. The driving water would balance the column to be raised. 2d. We have no data from which to give the amount or value of coal used by this government for steam purposes. It has varied greatly within two years.

Business and Personal.

The charge for insertion under this head is one dollar a line.

EXTENSION NOTICES.

Lavinia L. Bartlett, administratrix of the estate of Russell D. Bartlett, deceased, of Bangor, Me., having petitioned for the extension of a patent granted to the said Russell D. Bartlett the 14th day of March, 1854, for an improvement in machines for making shovel handles, for seven years from the expiration of said patent, which takes place on the 14th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of March next.

B. G. Fitzhugh, of Elliott City, Md., having petitioned for the extension of a patent granted to him the 28th day of March, 1854, for an improvement in harvesters of grain, for seven years from the expiration of said patent, which takes place on the 28th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 9th day of March next

Wm. H. Seymour, of Brockport, N. Y., having petitioned for the extension of a patent granted to him the 28th day of March, 1854, for an improvement in harvesters, for seven years from the expiraton of said patent, which takes place on the 28th day March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 9th day of March next.

Improvement in Weather Board Hooks.

The implement shown in the engravings is a combination of a weather board hook, spirit level, graduated rule, marker and gage. Fig. 1 is a side view, Fig. 2 a back view, and Fig. 3 a front view of the tool. It is about twelve inches long, one inch in thickness, as in Figs. 2 and 3, and from one to two inches wide, as in Fig. 1. The back, front, and one side —that in Fig. 1—are covered with a smooth brass plate. The sides and back are perfectly straight, the middle portion of the front for about seven inches is also straight and parallel to the back. It is terminated at either end by the perpendicular walls of two shoulders, A. In the center of this side is set a spirit level, B. The back, C, of the implement is a scale or rule, graduated from the point, D, into inches and their fractions. A slide gage, E, may be moved back and forth along this graduated plate in the slot by a screw turned by the thumb knob, F. This forms a very convenient spacing gage for laying out work.

The side presented in Fig. 1 has a long groove in the brass plate in which the knob, G, slides. This knob carries a pointed blade which is held in place by the thumb nut, G, and is used to mark across the board. The conveniences and advantages of this combined tool must be apparent to every carpenter. It is the subject of letters patent granted December 31, 1867, to John Nester, of Portland, Oregon. Communications relative to rights, etc., may be addressed as above.

Fig. 1

Fig. 2

Fig. 3

NESTER'S WEATHER-BOARD HOOK & COMBINED CARPENTER'S TOOL.

Improvement in Skates.

The elegant and fascinating pastime of skating, in which at the present day all ages and classes participate so extensively, during the winter season, and which may be called one of the few pleasant smiles which seem to greet us from the countenance of hoary old Jack Frost, seemed to receive a new impetus a few years since, by the adoption of it by the ladies; and, since this very sensible assertion of woman's rights, has increased year by year, until the trade in this auxiliary to winter sports and rosy cheeks has assumed most extraordinary proportions, the number of skates of all kinds manufactured and sold in the United States amounts to fabulous sums. For a number of years skates were secured to the feet by a clumsy arrangement of straps, buckles, screws, pins, etc., and were, to say the least, inconvenient and uncomfortable. Various attempts have been made from time to time to produce an article which should take the place of these adjuncts of a winter afternoon's sport, and with various degrees of success; but none which seem to recommend themselves more highly than the one herewith illustrated, known as "Forbes' Patent Acme '67 Skate," in contradistinction to a former pattern by the same inventor, who tells us he started resolved to produce a skate which should be universally adopted, and recommend itself alike to manufacturer and user—a resolution which, we think, he has fully carried out.

Fig. 1.

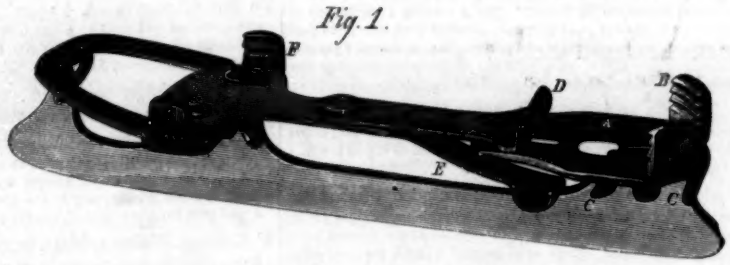
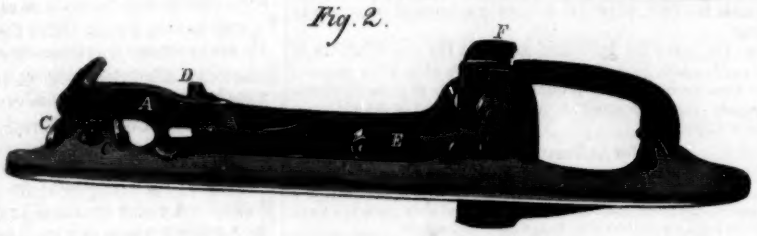


Fig. 2.



FORBES' PATENT ACME "67" SKATE.

In the engravings, A represents the heel clip, with corrugated projections, B, to engage with the back of the heel. This portion is rigidly secured to the runner by two embracing lugs, C, and a screw. The front portion, D, of the heel, is movable by means of an adjustable bolt and nut traversing in a slot in the middle piece, E, as seen plainly in Fig. 2. Two adjustable corrugated projections, F, serve to secure the front of the foot. These may be so arranged as to secure the runner in the center of the sole, or on one side, as may be desired.

The inventor says this skate has the following points of excellence: It is composed of the fewest number of pieces necessary to produce the required combination of motions. It is strong, being made from plate cast steel, entirely, except the runner. It easily adjusted to suit different boots. It requires no plates in the boots, and there are no holes to get filled up with dirt, snow, or ice. It may be readily detached from the runner, to clean or to grind the runner, and is not expensive to manufacture. It may be fitted to the boot in the center, or to the inside, as may be desired, and when once set for a pair of boots, will always occupy the same position on the foot when taken off and replaced. It is extremely light and elegant in appearance, and requires but a second or two to apply it to the foot.

Orders and communications should be addressed to Starr Manufacturing Company, Dartmouth, N. S. The right for the United States is for sale by the inventor, John Forbes, who may be addressed as above. Patented through the Scientific American Patent agency, July 2, and October 8, 1867.

Labor and Luck.

Among the wise sayings of Rev. H. W. Beecher are the following:—The mere fact that you are obliged to labor is not a misfortune. The mere fact that your labor produces slow results is not a misfortune. The thing that you desire as an alleviation would be the greatest curse to you. Do not be ashamed of that place where God has shut you up. God has put your tasks upon you, and remember that your enjoyment is to consist in the essential manliness of your nature. It is to consist in the active use of those forces which God has endowed you with, wherever his providence has put you. And if he has withheld from you some of those enjoyments which he has granted to others, be assured if you are faithful, that in some way they will be made up to you. Do not be ashamed of hardness. Stand to it and fight out your battle. See to it that, whatever you lose—whether it be money, or place, or what not—you do not lose manhood, or courage, or honesty, or simplicity, or truthfulness. Stick to them. They are half your your life.

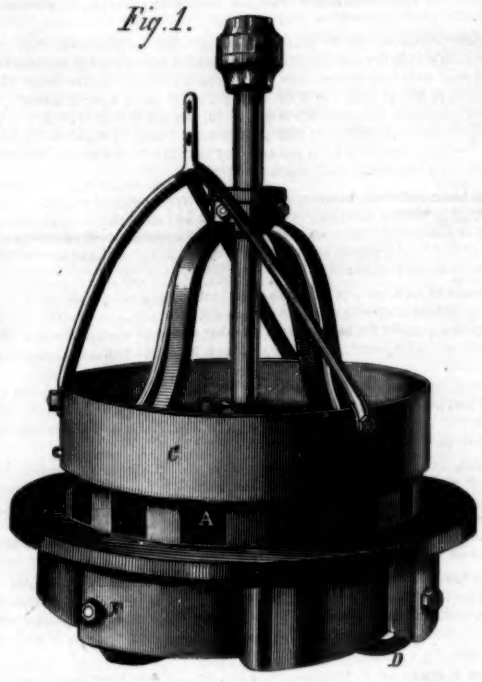
I think if you were to go from man to man, in all the ordinary channels of life, you would find very few men, if you took them at that hour when they made their secret complaints, who did not labor under the impression that though they should be resigned to their condition, it was a condition of misfortune that they were obliged to exert themselves. The young man, beginning in life, says to himself: "I am obliged to rise early, and sit up late, and labor incessantly; but I hope for a better time." Ah, yes! that better time is the fool's paradise of laziness. He is obliged to work now; but he looks forward to the time when he will not be under the necessity of working. He points to the favored sons, as he calls them, of rich men, who were not born to work, and who are useless, and worse than useless, in society, and laments that, instead of having their good fortune, he is doomed to a life of severe toil. But I tell you, what you call good fortune has been their ruin, and the necessity of laboring has been your salvation. It has been that which has made you what you have been, and what you are still. It has been a token of God's mercy to you. And instead of bemoaning your condition, thank God for it.

BROWN'S DOUBLE-ACTION TURBINE WHEEL.

The turbine form of water wheel has justly obtained precedence over the breast and overshot on account of its utilization of a very large percentage of the power employed, from 75 to 85 and even 90 per cent being claimed in some cases. The principle obstacle to its best performances has been, undoubtedly, a want of proper construction to allow the easy discharge of the water after having performed its work. Possibly, also, the whole power of the water admitted to the wheel is not employed in its propulsion; and perhaps it could not be so employed. Yet anything like an approach to it would be a gain. The wheel shown in the accompanying engravings is constructed with a view to obviate these defects.

Fig. 1 is a perspective view of the wheel with the concentric gate partially closed; Fig. 2 is a plan view of the wheel, its buckets, and the outer casing, and Fig. 3 is a vertical section of one of the return or reacting buckets. A are the buckets of the wheel, the peculiar form of which is seen in Fig. 3; B, the openings or inlets for water. The gate, C, Fig. 1, can be raised or lowered as may be desired to admit the quantity of water desired. The weight of the wheel and shaft is supported by a step in the center of the spider, a part of which is seen at D, same figure. The water passes into the wheel in the direction of the arrows in Fig. 3, striking against the curved abutment, A, and passing around the partition, E, reacts against the outer wings, F, shown in perspective in Fig. 1, and by dotted lines in Fig. 2, thus giving an additional impetus to the wheel by the impact of the water.

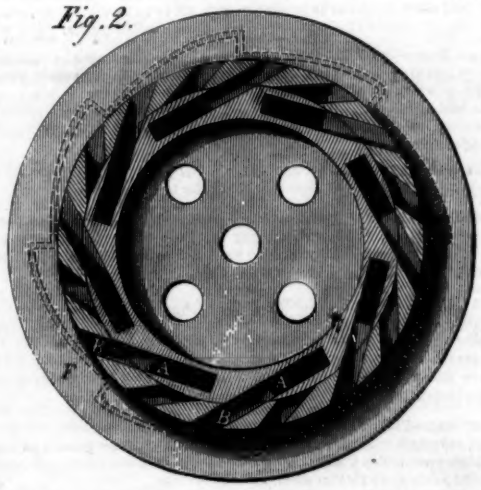
Fig. 1.



The case of the wheel is much larger in diameter than the wheel itself, and allows the free exit of the water after having performed its work. The manufacturer of the wheel says:

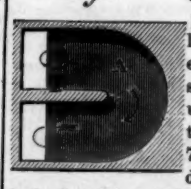
"In a recent trial of a wheel of this construction superintended by myself with great care the wheel gave off a clear percentage of useful effect equivalent to 90 per cent of the water expended. This, I think you will agree, is a remarkably good result, especially as nothing was left to theory or calculation, the wheel was actually put to work, the weight actually lifted and the friction of the apparatus employed carefully measured. My experiments extended through a number of trials with different weights and the result given above is the average, the wheel doing even better than this in some of the trials.

Fig. 2.



"The wheel used was only 30 inches in diameter and the weight lifted on the first trial was 22,728 pounds, 6 feet, 9 inches in one minute, on second trial 16,876 pounds, 11 feet, 6 inches per minute. The water expended on the first trial was 184,571,136 lbs. per minute and the weight 22,728 lbs. lifted 6 feet, 9 inches in one minute is equal to 153,414 lbs. lifted one foot in the same time. On the second trial the water used was 224,294 pounds per minute and the weight lifted in the same time 195,761·6 pounds; the average result after deducting the friction, which amounted in both trials to 2,498 pounds, is 90 per cent of useful effect."

Fig. 3



The patent for this wheel was obtained through the Scientific American Patent Agency May 1, 1866, by Harvey Brown. All communications relative to it should be addressed to Harvey Brown, Urbana, Ohio, or the Ohio Machine Works, Cincinnati, Ohio.

PETROLEUM IN ITALY.—The Government of this State has lately granted three privileges for boring wells on the territories of Farnuovo, Taro, and Medesano. Two of them have been given to American capitalists, who intend to go to work as soon as they get their "grande machine," as the Italians call them and which they expect from this country.

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VOL. XVIII., No. 3....[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, SATURDAY, JANUARY 18, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

GAGING THE DIAMETER OF CYLINDRICAL BODIES.

Sometimes the simplest tools used by the mechanic are the most difficult to use properly, because of this very simplicity. The proper use of the file for instance, can be acquired only after long and patient practice, yet no tool used by mechanics is simpler in form and construction. The callipers is another instance, and even those rigid steel gages for measuring one particular size will give different apparent results in different hands. Delicacy of touch—the educated fingers—an experience acquired and rendered valuable only by long practice is necessary to the use of the callipers. The two jaws but touch at an almost infinitessimal point on either side of the object to be gaged and if that object is a cylinder the act of gaging requires much caution.

The machinist's apprentice invariably gages large, or he forces the callipers over the shaft in one place and allows it to pass without pressure in another; the consequence is an imperfect job. As much depends on the manner of use as on the reliability of the instrument. Unless the same degree of force is employed at all times and on all parts of a shaft in callipering, the result is imperfect work. Testing a turned shaft while rotating is eminently unreliable; the presence of oil or dirt on the surface of the shaft will render the gaging inaccurate, and callipering a shaft on the rough surface left by a dull tool is useless.

It is surprising that mechanics do not more generally use a gage that measures the whole circumference rather than one that touches it at only two points. The callipers is valuable in detecting irregularities in the cylindrical form, but a simpler tool will more accurately determine the size of one portion as compared with another. It is merely a flattened copper or steel wire furnished with a handle at each end. When used, one end is passed under and around the shaft and drawn past the other, one end being held in one hand and one in the other. By slacking up a trifle and moving the wire back and forth around the shaft it will accurately fit the shaft's surface, when a line can be drawn with a scratch-awl across both parts of the wire where they pass each other on the shaft. These lines will be the gage for the size until the job is finished. If the shaft is too large the two lines will not meet and if too small they will pass each other. Copper is preferable to steel wire, as it is more yielding to the curvature of the surface of the shaft. Of course this is not to be used while the shaft is turning, as the wire would soon become enlarged by wear. For ordinary purposes the callipers are sufficient, but where accuracy is required we commend a trial of the wire callipers.

ENGINEERING TALENT REQUIRED IN AGRICULTURE.

This country is new. Although portions of it have been settled by civilized men more than two centuries, yet those portions, the earliest settled, are still new when compared with European countries. Neither Virginia, the site of the first English settlement, nor Massachusetts, the home of the pilgrims, exhibits the careful culture or even the settled appearance of many European localities. Vast tracts of valuable land lie unreclaimed in Virginia; and almost as large an amount in the aggregate, although distributed in smaller parcels, are fallow and untouched in the Eastern States. These neglected lands, valuable only as pastures, are really the richest on our farms. They are called "sour," barren, and "cold," but they need only judicious aid to become generous, fertile, and valuable. Marshes may be made fields, swamps be reclaimed and made fertile meadows, and sand hills, gardens, by the employment of manual skill, guided and directed by scientific knowledge. Our now barren hillsides may be made to return a rich harvest of edible products, and our rocky, stony, slopes to give sustenance to sun-loving products with the aid of intelligent management joined to industrious carefulness.

We do not advise the expenditure of money upon all lands now unproductive. Happily we have millions of acres of the richest soil unimproved and unused which require no outlay beyond the ordinary labors of the husbandman to produce in profusion grain, vegetables, and fruits. But there are localities in the immediate vicinity of our mercantile and manufacturing centers which would richly repay the expenditure of scientific talent as well as manual labor.

For this result we need the direction of our engineering and scientific talent into this purely utilitarian channel. We need agricultural engineers. Engineering, as at present understood in this country, is considered nothing unless directed to the inception and completion of large works of a private nature, or those of a public character. Farming, unless "landscape farming," the decoration of the villa of some retired business man or ambitious ruralizer, or the laying-out of some public park, is almost entirely ignored by our engineers.

We are aware that much money and time has been spent within the past fifteen years in amateur farming, each landholder being his own engineer as well as manager. Most of those who desire to improve the condition of their lands have believed that but little practical knowledge was required; the theories obtained from manuals and periodicals they supposed all-sufficient. Perhaps this was and is a mistake. It may be possible that men, not practical or resident farmers, might know better what to do to reclaim a bit of waste land than the farmer himself; at least such men are to be found in Europe, and we do not believe they are wanting in this country. Certainly there is room for the exercise of engineering talent, beside the building of bridges, aqueducts, tunnels, and other works of a public character, and for the proper employment of scientific knowledge. Notwithstanding the rapid increase in our manufacturing facilities, we shall still be, as a nation, agricultural. It would be well that our scientific mechanics believed this and diverted some of their talents to the improvement of the land. When they do this we may look for a new era in the development of our natural resources. The field is wide and extensive, but the laborers—the willing laborers—are few.

THE CARE OF WATER PIPES IN WINTER.

Where water is conveyed to dwellings by pipes whose ramifications extend through the building, it is difficult to prevent it from freezing, as however perfectly the house is warmed there are passages in the walls, under the floors, through the area, and in other places where the heat cannot affect the pipes. Severely cold nights will at times leave the evidence of their recurrence either in frozen or ruptured pipes.

A common plan adopted is to leave the water running during the night, which besides being wasteful and extravagant where the water must be paid for and the supply is limited, is not always effectual. The freezing begins from the outside of the pipe, and allowing a diminutive stream to flow through the cold hours of the night may diminish the danger of freezing but not entirely prevent it. The proper method is to have a cock in the cellar by which the water can be turned off from the distributing pipes.

When a pipe is frozen, pouring down hot water is of no use. It is speedily cooled and becomes as cold as the pipe, while it cannot be removed. Cloths wound about the pipe and hot water poured upon the cloths is the most effectual means for thawing frozen pipes we have ever tried. Still with any preventives or remedies, constant care and judicious management are required to prevent annoyances from frozen water pipes.

THE WEAR OF IRON RAILS.

Railway managers and stockholders, if not the public generally, are well aware that the life of rails lately laid is much much shorter than those put down when railroading was in its infancy in this country, The *Railway Times* states that "in one case on the Boston and Providence line, iron rails have been in continuous use on the main track over thirty years; in an other on the New Bedford and Taunton, iron rails have worn twenty-seven years, and are still in good condition; and the original 45-pound rail laid down on the Philadelphia and Reading lasted over twenty years under an amount of traffic unsurpassed in this country; and we have several other accounts of rails that have worn from fifteen to twenty years. The rails especially mentioned above were of English make, or rather Welsh make, and weighed only 45 pounds to the yard. The specifications for the manufacture of these rails were very short, and were stated concisely as follows:—'Best No. 1 cold-blast mine iron was first run out in a finery fire; second, puddled, and the balls shingled under tilt hammers; third, rolled into bars; fourth, these bars were cut, piled, heated, and hammered into blooms; and fifth, these were re-heated and rolled into rails.' The rails thus made and thus light in weight, stood an amount of wear very much greater than rails since made have been capable of, even when the weight is double per yard. Indeed it has been in one instance, shown by templates, that the wear of a 62-pound modern-made rail is greater in a use of a single year than that of the old 45-pound rail in a continuous wear of twelve years."

It is well known that a large proportion of modern made rails have worn so as to need repairing within two years after being laid, and in many cases they were entirely worn out in five years. It is certain that as good ore can now be obtained as could be twenty or thirty years ago, and that the processes of working iron have received many improvements; so it would seem that we might obtain rails not only equal to those mentioned above, but that we ought to get superior work. Whether the opposite result is to be attributed to the parsimony of railroad managers or the cupidity of manufacturers is a question we do not care to discuss. It is certain, however, that true economy and real business enterprise demand an improvement. Perhaps the authority from which we quote is correct when it says:—

"The iron can be under-worked, leaving too much cinder in it, the common fault, or it may be over-worked, as it is found in practice that the old 45-pound rail, so remarkable for its wearing qualities, when re-worked into rail looses its original superiority, and is apt to be too soft. The mixture and amount of working needed to give the great wearing qualities pertaining to the earlier make of iron rails, we think rail manufacturers could easily find, if railway managers would pay a fair price for the article when made. Wearing qualities are worth paying for in rails as in every thing else. A machine that will last twenty years, doing a given amount of work, is surely worth double that of one that will not last but five years. Our remarks are just as applicable to steel rails as to iron. Railway managers must insist upon good wearing qualities, and rail manufacturers may very properly insist upon being well paid for good work."

IRON WORKING—THE PUDDLING PROCESS.

Our article on puddling, published on page 361, Vol. XVII., has brought out several letters from practical men. P. McC., of New Jersey, says: "Your article is in the right direction. If there is any one employment in the mechanic arts which calls for improvement by the inventive genius of the age, it is that of puddling. In the first stage of the process, when the metal is melting, and in fact until it has reached what is termed a "foment," it exhibits the strangest tendency to stick to the bottom, back wall, bridges, jambs, etc., and if allowed to do so, there it must usually remain until loosened by the increasing heat. While "balling," bad melting cannot be remedied; the iron that was permitted to stick has not advanced a stage, yet it must be got rid of. It will not run off with the slag, and it is "sopped" up by rolling the balls into the now fomented iron, until absorbed. The after working, squaring, rolling, heating, etc., will work out some of it, but not all. This is the greatest difficulty encountered in the adaptation of mechanism as a substitute for the live puddler, who has eyes to see, judgment to guide, and hands to manipulate the contents of the fiery furnace."

W. R. J., of Pennsylvania, writes: "Your article on the puddling process will, I know, be read with great interest by all your readers concerned in the manufacture of iron. I have always thought that this most important process has never received the attention it deserved from those writing on cognate subjects. I am satisfied that there are a great many of the readers (myself among the number) of your excellent paper that would like to see the article referred to followed up by some of our practical men in a series of articles on this important subject; and carried through the rolling-mill department. I have been a weekly reader of your valuable journal for a long time, but have never summoned up courage to write to you on this subject. But as you have introduced it in such an able manner I hope to see a continuation, and ask you to invite the attention of persons qualified to communicate the results of their experience to numbers of American iron workers who are anxious to learn."

A Popular Error.

Sometime ago we noticed in an exchange a statement that "some old iron is rendered much more valuable by being knocked about. Thus, old iron in the form of horseshoe nails, and, indeed, horseshoes themselve, fetch a much higher price than the original metal from which they were made; the toughness it acquires by constant blows and concussions gives it a greatly enhanced value in the market." We much doubt this; the toughest wrought iron rather becomes deteriorated by "constant blows and concussions," unless these blows are given while the material is in a semi-plastic state, as when red hot. It is well known that the material for horseshoes and horseshoe nails is of the toughest and most fibrous iron. It is not uncommon to see a farrier or a country blacksmith take a nail rod, and without placing it in the fire, form a nail which, by the percussion of hammer and anvil, becomes red-hot, so that the finished nail is cut off and falls glowing at the foot of the anvil. This could not be done with any but the toughest iron. Possibly the thorough hammer-working to which horseshoes and horseshoe nails are subjected in the process of their transition from the bar to the finished article enhances their value so that they may fetch a higher price than the original metal; but the reason is not to be found in their use on the feet of horses or on pavements, but in the toughness acquired in their manipulation.

The Coroner's Jury on the "Angola" Disaster.

The coroner's inquest into the causes of the late railroad disaster at Angola, N. Y., after eleven days' investigation, has decided that the accident was caused by a bent axle under the car which was burned—the last car on the track, that which first left the rails. The jury recommended the adoption and enforcement of a more thorough system of gaging and inspecting wheels and axles.

THE SURGEON GENERAL'S REPORT for the year ending July 1st, just received, shows that during this period two hundred and eighty soldiers were furnished with artificial legs; two hundred and thirty-six with arms, and thirty-eight with surgical apparatus. Six feet, nine hands, three eyes, and one palate complete the list of artificial substitutes provided for the loss of dame nature's gifts.

STEEL WHEELS AND AXLES.

Men whose business it is to know such things are aware that cast iron is the poorest of all metals to withstand shock or strain, and that its cheapness and the facility with which it can be produced, is the sole reason of its adoption for general purposes. In proof of this assertion we have only to refer to the continual efforts made to improve its character by alloying it with copper. wrought iron, and other metals, but the general results have not been satisfactory or at all uniform. Cast steel has also been tried for castings, but except in a few instances, no reliability as to soundness and strength has been attained.

Steel ingots, of course, are cast daily comparatively free from flaws, but these are cast in iron molds which are not admissible save for the plainest forms of castings in steel. It is impracticable for this reason alone, if for no other, to make molds for steel castings for general purposes,and the production of castings, which are well known to have a much higher cohesive strength than iron, has been greatly delayed. By long experience, however, and after a series of costly experiments, Mr. Wm. Butcher, formerly of Sheffield, Eng., but now of the steel works bearing his name in Philadelphia, has been able to cast and core out steel in green sand molds from wooden patterns, and to produce a metal which, for soundness and strength has never been equalled. The results are certainly gratifying to every mechanic as regards advancement in this branch of trade. We have seen spur wheels, pinions, bevel wheels, railway frogs, hydraulic cylinders, cams, and mechanic work generally, made under his direction, which were beautiful specimens of work. The car wheels in particular merit great attention and will bear the closest scrutiny as regards soundness and strength. In the latter quality they are far in advance of the very best cast-iron gun metal we have ever seen. The best tests by government do not show more than 38,000 pounds to the square inch, tensile strength for cast-iron gun metal, whereas a piece of one inch section, taken from one of these car wheels, tested in a machine at Whitney & Son's Car Wheel Works, gave the extraordinary result of 82,347 pounds. When it is considered that the limit of endurance claimed for wrought iron is 55,000 and 60,000 pounds, some idea can be formed of the tenacity of this metal.

We speak in this connection merely of "cast" steel, and not of that which has been hammered. It will readily be conceded that metal of the same quality, subjected to the hammer, would have a tensile strength unsurpassed. Indeed steel axles of the make alluded to—4¾ inches diameter, supported three feet apart—have borne the impact of 630 pounds falling 26 feet, 37 times, with an average deflection of 2¼ inches back and forth before breaking. Such endurance as this requires no further comment.

It is gratifying to know that railway managers are availing themselves of Mr. Butcher's skill and experience, not only for its pecuniary value to their companies, but what is of far greater importance, the safety of their passengers.

We feel that we are doing them a service in setting forth these facts as strongly as possible, and that the success of accidents from broken flanges and "sprung axles" are rapidly diminishing with their introduction.

Diseases of the Stomach.

The following practical hints on the nature and treatment of certain diseases we copy from that most excellent monthly, the *Herald of Health*:

CHRONIC INFLAMMATION.—Sub-acute gastritis, or chronic inflammation of the stomach, is of frequent occurrence. It sometimes follows acute gastritis, but is more often developed by unphysiological habits. In many of its symptoms it resembles acute dyspepsia, or a mere functional derangement of the stomach, and it is not always easy to discriminate between the two. The stomach is far more liable to chronic than to acute inflammation.

CAUSES.—Among the most prominent causes may be named alcoholic stimulants, hot tea and coffee, over-eating, the use of mustard, vinegar, pickles, horse radish, pepper, condiments, irritating medicines, corrosive poisons, etc. When we consider what an incongruous amount of stuff is taken into the stomach at a modern luxurious dinner, we ought not to be surprised that this organ is frequently the seat of severe trouble. Soup, fish, flesh, oil, vinegar, pastry, confectionery, ice cream, nuts, fruits, vegetables, wines, and numberless other minor ingredients, of conflicting chemical qualities, are among the materials "thrown in." Stir these things all up in a vessel together, and who of us would not sicken at the appearance and odor. Yet at a modern dinner it is a common thing to have all these heterogeneous substances crammed into the human stomach, there to ferment and generate those vicious and pernicious gases that cause disease. Truly "Man is fearfully and wonderfully made;" no other creature could exist on such a diet. It would kill a gorilla in a month. It does kill, although more slowly, thousands of that high and mighty variety of the human race commonly called "gentlemen." Violent exercise after eating, large drafts of cold water when the body is heated, and the habit of constant stuffing, will, after a time, cause chronic inflammation of the stomach. Long fasting is said to be a cause, though this is not generally the case. This condition is sometimes observed in dogs who have died of starvation. Arsenic and other substances applied to external wounds may cause it.

SECRETS OF HEALTH.—First, keep warm. Second, eat regularly and slowly. Third, maintain regular bodily habits. Fourth, take early and very light suppers. Fifth, keep a clean skin. Sixth, get plenty of sleep at night. Seventh, keep cheerful and respectable company. Eighth, keep out of debt. Ninth, don't set your mind on things you don't need. Tenth, mind your own business. Eleventh, don't set up to be a sharp of any kind. Twelfth, subdue curiosity. Thirteenth, avoid drugs.

TREATMENT OF CONSUMPTION.—It seems at first sight as superfluous to state that in a disease of debility like consumption, patients should breathe pure air, as that they should have good nourishing food, but it is not so. Theoretically, the value of pure air is accepted; but practically it is universally neglected. Healthful respiration has yet to be applied not only to every-day life, but in the treatment of disease. In ill health, and particularly diseases of the respiratory organs, the dictates of science and common sense are grossly outraged. If those persons who have consumption, or who have an inclination to it would spend an hour every day in breathing pure air to the fullest extent to which their lungs are capable of taking it in, they would do more to prevent and cure this disease than it is possible to do by medication.

Effect of Darkness and Silence.

Dr. Kane, and other Arctic voyagers, have all testified that in those regions "where eternal silence reigns supreme," the effect upon the brain and ear from the absence of sonorous impulses in the atmosphere is exceedingly annoying and absolutely injurious to the auditory nerves. As the organs of hearing are destroyed by loud and continued noise, and an intense light will weaken and ultimately destroy the power of sight, so it would appear that the auditory, or optic, nerves become impaired by the partial or total deprivation of their natural stimulus, sound or light. Dr. H. Ralls Smith, of Chicago, wishing experimentally to investigate this subject, recently spent a considerable length of time in the Kentucky Mammoth Cave, where silence and impenetrable darkness reigned supreme. The effect was very distressing and almost insurmountable, resulting in temporary defection of hearing and aberration of mind. From his own experience this gentleman is firmly convinced that the blindness of the finny denizens of this cave has been brought about gradually through successive generations, and from his observations he is confident that the sense of hearing is also wanting in these beings, although originally existing in the species when first immersed in their living tomb.

Obituary.

WILLIAM MITCHELL GILLESPIE died on the first day of the present year, at the residence of his father, in New York city. He was a native of New Yock State, a graduate of Columbia College, and subsequently Professor of civil engineering in Union College, a position he retained until his death. He was the author of a practical manual on "Roads and Railroads," generally regarded as a text book and authority; of an abstract of the writings of Auguste Compte, and of a volume entitled "Land Surveying," beside many articles furnished to the journalistic press. He was quite independent in his modes of thought, genial in manner, although somewhat finical, a warm friend, a thorough student, and honest investigator. He was much beloved by those under his care, as a teacher, and highly appreciated not only by the faculty of the college, but by a large circle of friends, as well as by the scientific world at large.

OFFICIAL REPORT OF
PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 31, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

72,711.—PAPER FILE.—James Adair, Pittsburgh, Pa.

I claim the paper holder, as a new article of manufacture, constructed substantially as described.

72,712.—HAND GRIPPING TOOL.—E. A. Alpress, Bristol, Conn.

I claim as a new improved article of manufacture, tongs or pliers, the handles, a, pivoted together at a', their outer ends pivoted to the jaw, c c, while the rear ends, d d, of said jaws work in sockets, 11, to produce the opening and closing of said jaws parallel to each other, substantially as described.

72,713.—ANIMAL TRAP.—S. M. Armstead, Grand Haven, Mich.

I claim, 1st, The method of raising the trap door, A, by means of the connecting chain, B, and the treadle, C, arranged substantially as described, for the purposes described.

2d, The spring hook, D, and its attachment to the bait hooks, E E, operating substantially as described for the purpose indicated.

3d, The combination of the trap door, A, the connecting chain, B, the treadle, C, the spring hooks, D, and the bait hooks, E E, with the box, F, and cage, G, arranged to operate substantially as set forth for the purposes designed.

72,714.—STEAM ENGINE.—Wm. Ball, Chicopee, Mass.

I claim in a steam cylinder the arrangement of the depressions, t, formed with reference to their induction and eduction ports at points intermediate between the ends of and around the inside circumference of the cylinder, substantially as and for the purpose described.

The arrangement of the steam passages, k, for conducting steam from the cylinder, below the piston head, in its ascent, around into space between the piston and cylinder head, to form a cushion for said piston, substantially as shown and described.

In said cylinder, the arrangement of ports, h1 h2 h3 h4, for operating the valves thereof, substantially as described.

The cut-off valve, f, in combination with the balance valve, e", and piston, c, substantially as described.

The steam port, 1, in combination with port, 2, so arranged as to hold the piston in a fixed position until released, to prevent damage to the lower head of the cylinder, substantially as shown and described.

The arrangement of the steam exhaust port, 4, by which a free exhaust of steam from the upper end of the cylinder is effected before the ascent of the valve, e", substantially as shown and described.

Producing a rotary reciprocating in connection with a vertical motion of the piston, c, in connection with one or more ports, h1 h2 h3 h4, substantially as shown and described.

The port, 4, arranged with reference to the ports, 6 and 7, whereby a free exhaust is secured after the ascent of the piston, c, and by which, in connection with the steam cushion at the upper end of the cylinder, all injury is prevented to the cylinder in its ascent, substantially as described.

72,715.—MACHINE FOR STAMPING ORES.—Wm. Ball, Chicopee, Mass.

I claim, 1st, In connection with a quartz crushing machine, the sills, D, when constructed of metal in place of wood, as and for the purpose described.

2d, Arranging the bed plate, J, crosswise of a series of spring timbers, E, having their bearing upon metallic sills, D, substantially as and for the purpose described.

3d, The construction of the staves, e', tapering in form from the bottom toward the top, as specified, to suit the bell form of the mortar, substantially as and for the purpose set forth.

4th, The hammer die, e, in combination with the surrounding stave-holding ring, e', substantially as and for the purpose described.

5th, The two-part ring, h, secured beneath the top plate, and between it and the lining around the stamp-shaft opening, substantially as and for the purpose described.

6th, A tubular urn-shape ring necking, d, made in two parts, and secured upon the top plate around the stamp-shaft opening substantially as and for the purpose described.

7th, The connection of the stamp shaft, K, with the steam piston, I, by means of the bonnet, I", flange, i', and collar, j, with the interposed elastic washers, as described, all arranged and combined together in the manner and for the purpose set forth.

72,716.—MANUFACTURE OF SLEIGH BELLS.—Wm. E. Barton, East Hampton, Conn.

I claim the globular sleigh bell, cast in one piece, as herein described.

72,717.—CAR COUPLING.—Edwin R. Bigelow, Salem, Mass.

I claim the arrangement and combination of the opening, f, in the top of the draw-bar chamber with the tumbler, made substantially in the manner, and arranged in rear of the mouth of the draw bar, and applied thereto, so as to operate with a compound motion, as specified.

Also the arrangement of the journals or pin, c, of the tumbler, so as to be below that part of the tumbler which supports the pin when the tumbler is in its lowest position, in combination with vertical slots, d', made in the sides of the chamber, d, of the draw bar, the tumbler being formed substantially as represented.

Also the arrangement as well as the combination of the abutments, or their equivalent, with the draw bar, and with the tumbler applied thereto, so as to operate with a compound motion, as and under circumstances substantially as hereinbefore set forth.

72,718.—HEAD ROLLS FOR PIN MACHINES.—E. F. Bradley (assignor to Howe Manufacturing Co.), Birmingham, Conn.

I claim the combination of the two wheels, B C, having a groove formed in each of their peripheries, and revolving at different surface velocities, when arranged in relative position to the carrying device substantially in the manner herein set forth.

72,719.—METHOD OF MAKING HUB BANDS.—Edwin B. Butler, New Britain, Conn.

I claim the method herein described of making hub bands, that is to say, take a strip of metal of width equal to that required for the band, and of proper length, welding the two ends of said strip together, and afterward swaging the same in dies, constructed substantially as set forth.

72,720.—STEAM GENERATOR.—G. H. Clarke, Brooklyn, N.Y.

I claim the arrangement of the series of hollow balls constructed substantially as described.

72,721.—WIND WORM FOR BLACKSMITHS' BELLOWS.—Christopher F. Conrad, Adrian, Mich.

I claim the serpentine wind channel, C B, constructed and operating in the manner and for the purposes substantially as set forth.

72,722.—HARVESTER.—Robert F. Cooke (assignor to himself and Peyton B. W. Cooke), Newark, N. J.

I claim the cam wheels or grooved drum, B, constructed with inclined and straight surfaces, r r', alternately, so that when the inclined surfaces, r, pass the lever, motion will be communicated to the knives, and when the straight surfaces, r', pass the lever, the knives will be at rest, substantially as and for the purposes described.

72,723.—BURGLAR ALARM.—C. J. Crum and Wesley Irwin (assignors to C. J. Crum and James Harsha), Circleville, Ohio.

We claim, 1st, The combination with the stock, A, and notched flange, a a1 a1, of the hammer, E, spring, D, rod, C, match-lighting nipple F, and a screw or other attaching device, K, substantially as described.

2d, The combination with the parts, A a D E and F, of the lamp bracket, H, and match holder, J, substantially as described.

72,724.—HEEL SHAVE FOR BOOTS AND SHOES.—F. S. Dawes, Hudson, Mass.

I claim, 1st, The combination with the slotted parts, D D, of the bridge, A, screws, d d, and blade, C, substantially as and for the purposes set forth.

2d, The combination with the slotted pieces, D D, bridge, A, and handles, B B, of the blade, C, guard piece, F, and screws, d d and f f, substantially as and for the purposes set forth.

72,725.—WATER DRAWER.—James Daykin, Cleveland, Ohio.

I claim the yoke or loop, C, and stem, E, as arranged in combination with the valve, F, and spout, A, for the purpose and in the manner substantially as set forth.

72,726.—MACHINE FOR BLOCKING AND SHAPING HATS.—Rudolf Eickemeyer (assignor to Eickemeyer Hat Blocking Machine Co.), Yonkers, N. Y.

I claim, 1st, Introducing steam within the banding shell, during the operation of stretching and blocking the hat body, substantially as and for the purposes described.

2d, In combination with a banding shell, or a series of banding shells, a valve controlling the steam passage thereto, connected with and moved from the vibrating frame or some other part of the machine, which moves in unison with the holding plates, substantially as described, whereby the valve is automatically opened to admit steam within the banding shell during the operation of stretching and blocking, and closed at other times to prevent the waste of steam.

3d, The combination and arrangement of a series of banding shells upon a wheel provided with a locking mechanism, and organized with respect to the hat block and holding plates, substantially as described, whereby the operator can readily shift the shells to correspond with required changes of size of hats, substantially as set forth.

4th, The arrangement and combination of the separate steam passages from the banding shells through the wheel, with the bearing and steam passage through the horizontal shaft on which the wheel of shells turns, substantially as described, whereby the steam is cut off from all the banding shells of the series except the one which is in the proper place to coöperate with the hat block and holding plates.

72,727.—BOOTS AND SHOES.—Alfred B. Ely, Newton, Mass.

I claim the use of resinous bodies combined with fibrous materials, substantially as described

Also a heel stiffener made of the above described substances, and formed into shape by means of heat and pressure, substantially as set forth.

Also a heel stiffener made of felted or woven fabric, saturated with resinous material, so that the article, when shaped under heat and pressure, shall possess the proper hardness and elasticity, substantially as described.

72,728.—BEATER PRESS.—George Ertel, Liberty, Ill.

I claim, 1st, The combination of a compressing and beater press, when arranged substantially as shown and described.

2d, The combination of the driving wheel, K, the slotted shaft, P, and the tongue, y, of a combined compressing and beater press, when constructed and arranged substantially as shown and specified.

72,729.—ATTACHMENT FOR SAFETY BRIDLES.—Reuben Fink, Lancaster, Pa.

I claim the lever, A, with its eye, a, and central pivot, b, on which is hinged a curved bearing, B, all combined and arranged in the manner and for the purpose specified and shown.

72,730.—GANG PLOW.—Wm. Foster, Greenfield, Ind.

I claim, 1st, In combination with the pivoted tongue, C, the guide straps or bars, L, pivoted jaws, M M', and treadles, N N', substantially as and for the purpose described.

2d, In combination with the treadles, N N', and pivoted jaws, M M', the spring, O, and stops, P P', substantially as and for the purpose specified.

3d, The upright lever, K, in combination with the frame, E F ff', and foot board, A2 k, arranged and adapted to be operated substantially as and for the purpose set forth.

72,731.—APPARATUS FOR COOLING BEER AND OTHER LIQUIDS.—Patrick H. Griffin, Albany, N. Y.

I claim, 1st, The employment of a series of chambers to receive and transmit the liquid to be cooled, in combination with each other, placed one above the other, as described, their floors being perforated so as to permit the liquid to fall in drops from the one to the other, being subjected in each chamber to a blast of air to facilitate cooling.

2d, The combination of an apparatus, as described, with a surface-cooling apparatus, substantially such as the hollow walls, and the coil of pipe, described in the above specification.

72,732.—FAN.—T. W. Hawkins, New Haven, assignor to himself and Moses Hawkins, Birmingham, Conn.

I claim, in combination with the several splints, B C D, etc., and the handles, A, the flange plate, E, when arranged so as to operate in the manner described.

72,733.—BEER COOLER.—Henry Heimerle, Buffalo, N. Y.

I claim, 1st, The combination and arrangement of the upright tank, A, with the inclined pipes or conductors, B, for the purpose and substantially as herein described.

2d, The combination and arrangement of the tank, A, conductors, B, and open troughs, C, constructed as and for the purpose herein described.

72,734.—BRICK FOR CURVED MASONRY WORK.—Edward Hennessey, Washington county, D. C.

I claim the bricks, made of stone or any material, corrugated and tapering, as herein described, for conduits or curved work, as in masonry, to prevent the bursting or collapsing thereof.

72,735.—SHEEPSHEARS.—John T. Henry, Hamden, Conn.

I claim, 1st, The head, C D, formed upon or attached to the shank of the blades, and constructed relatively to the edge of the blades, so that the two parts, C D, will bear hard together at the extreme point from the blades, and opening toward the blades so as to be adjusted by the screw, H, to govern the bearing of the blades upon each other, substantially as herein set forth.

2d, In combination with the blades, E F, and respective arms, A B, the head constructed so as to conceal the spring, substantially as set forth.

3d, In combination with the blades, E F, and the spring, G, the adjusting screws, a and b, in the arms of the respective blades, so as to operate in the manner described.

4th, The link, I, in combination with the two arms, A and B, arranged so as to adjust the opening, substantially as herein set forth.

72,736.—WAGON BODY.—Geo. W. Hoskin, Philadelphia, Pa.

I claim the inclined wagon body, D, arranged substantially as and for the purpose herein specified.

72,737.—FOUR-WHEELED VEHICLE.—Dean W. Hutchinson, Big Spring, Kansas.

I claim the attachment to four-wheeled vehicles of the cog plates, A A A A, the cog wheels, B B, the fifth wheels, G G, the arms, E E E E, the kingbolts, D D, the strap, H, the lock bolts, K K, the braces, L L L L, combined, constructed, and operated, as above described.

72,738.—PIANO FORTE ACTION.—Alexander B. Irving, Indianapolis, Ind.

I claim the repeating arm, C, attached to the key, A, and adjusted by means of the set screws, K L, spring, I, and set screw, J, the butt, D, attached to the arm, C, and jack, E, attached to the butt piece, G, of the hammer, the whole constructed and arranged substantially as set forth and described.

72,739.—MODE OF CONSTRUCTING SEWING MACHINE CASES.—John Johnson, Hartford, Conn.

I claim, as an article of manufacture, a sewing machine case, as described, viz., the tongue and groove miter joints, including panels, substantially as described.

72,740.—CLINOMETER AND LEVEL.—John L. L. Knox, Pittsburgh, Pa.

I claim a combined clinometer, plumb, and level, having a vertical circular box, with an arrangement of scales so graduated as to give, in connection with one or more index-fingers, the amount of deflection of an object from a vertical or horizontal position, in both circular and linear measurement, substantially as above set forth.

72,741.—TIP FOR GAS BURNER.—Reinhold Lanstrom, Cincinnati, Ohio.

I claim, 1st, The application of soapstone in the construction of tips for gas burners, when constructed and applied substantially as above described and shown.

Also, a new article of manufacture in the soapstone tips for gas burners, herein described.

72,742.—ELECTRICAL INDICATOR.—Samuel S. Laws, New York city.

I claim, 1st, An electro-magnetic indicating apparatus or instrument, whose indicating or working device can, by means of a single-toothed wheel and suitable mechanism, such as described, or its equivalent, be moved step by step in either of opposite directions, at will, in the manner and for the purpose specified.

2d, The lever, G or G2, having an armature at one end, and a spring pawl, J add J2, at the other, the spring stop pawls, K K2, the connecting rods, M M2, and the toothed wheel, E, when all combined and arranged together substantially and so as to operate as and for the purpose specified.

3d, The stop pawls, K K2, when arranged in connection with either one or both of the levers, G G2, and toothed wheel, E, or their respective equivalents, so as to operate substantially in the manner and for the purpose described.

72,743.—HARNESS SADDLE.—Wm. Leonard, Boston, Mass.

I claim a saddle, having its hair stuffing, d, protected from contact with the cloth, e, by an impervious lining, f, which is cemented to the inner surface of the cloth, substantially as set forth.

72,744.—COOLING MILLSTONES AND CURB.—John Mallin, Bedford, Ohio.

I claim the openings, E D, diaphragm, G, and fan, H, all combined and arranged as and for the purpose set forth.

72,745.—SOUND-BOARD FOR PIANO FORTE.—Lorenzo Matt, Boston, Mass.

I claim as my invention, the improved sounding-board made substantially as described, viz., of a series of layers of wood, differing in their widths, and tapering in their transverse sections, and laid flatwise on each other, and glued or cemented together with the grain of each one of the series crossing that of the next adjacent one at acute angles, all essentially as hereinbefore described, and as represented in the accompanying drawings.

72,746.—KETTLE.—H. Matthews, South Yarmouth, Mass.

I claim the combination and arrangement of the notched brace, D, with the cover, B, and the body, A, of the kettle.

72,747.—DIE STOCK FOR CUTTING SCREWS.—Duncan McArthur, New Haven, Conn.

I claim the arrangement described of the ring, C, with its cams, e, and plate E, combined with the dies, d, and the adjusting rack, D, the whole constructed so as to operate in the manner herein set forth.

72,748.—WHIP HANGER.—S. C. Merriam (assignor to himself and Daniel W. Talcott), New York city.

I claim the arrangement of two levers, B B, in combination with a wedge-shaped block, D, constructed and operating together in the manner and for the purpose substantially as set forth.

72,749.—WINDOW SHUTTER.—Philip Miller, Sharpsburg, Pa.

I claim the construction of a detachable inside window shutter, consisting of a frame, b, hinged sash or sashes, e, with removable panels of a translucent fabric stretched or spread over side and end pieces, f f, substantially as and for the purposes hereinbefore set forth.

72,750.—STEAM-ENGINE VALVE.—J. F. Morse, Oshkosh, Wis.

I claim, 1st, A balanced oscillating valve, having its face-plates, h and g, so arranged that as they are worn they may be adjusted by the wedges, o, constructed and arranged to operate substantially as described.

2d, The wedges, o, and nut, q, when constructed and arranged to operate substantially as described and for the purpose set forth.

72,751.—SEWING GUIDE.—Peter H. Niles, Boston, Mass.

I claim a sewing guide composed of a ring or clasp, provided with a rib, c, substantially as herein described and for the purpose specified.

72,752.—COW CATCHER FOR PREVENTING ACCIDENTS ON RAILROADS.—Wilson J. Orr, Manorville, Pa.

I claim the combination, with a locomotive cow catcher, of an interior sliding frame with protecting spikes or points, when constructed and arranged as herein described.

72,753.—MACHINE FOR PEGGING BOOTS AND SHOES.—D. D. Palmer, Waltham, Mass.

I claim, 1st, The stock, A, as constructed, and the sliding punch, B, having a toothed rack, e, connecting with the pinion, f, disk, g, and pitman, h, for operating the slide, D, as herein described.

2d, The movable piece or stock, E, pivoted to the handle or stock, A, for holding the awl slide or holder, D, as also the peg driving punch, H, and cutting blade, j, as herein set forth.

3d, The lever, O, pawl, P, and guide, M, as arranged, in combination with the slide, B, for feeding in the strips of peg wood to be cut by the combined action of the knives, j and N, and driven by the punch, H, substantially as herein specified.

4th, The combination of the stationary block, K, guide, M, cutter, N, with the movable block, E, and knife, j, substantially as and for the purposes herein set forth.

5th, The arrangement of the lever, S, pawl, u, spring, t, and friction roller, s, as constructed and combined with the plate, Q, and inclined ledge, v, on the sliding punch, B, so as to operate for spacing the distance between the pegs as they are driven, substantially as described.

6th, The gage, W, spring lever, X, point, y, and index, z, in combination with the stock, A, for a hand shoe-pegging apparatus, substantially as and for the purposes herein set forth.

72,754.—STOVE GRATE.—Daniel E. Paris, Troy, N. Y.

I claim, 1st, Two grates, lying side by side, having each two outwardly-projecting journals, eccentrically attached, on either end, at or near their front or back sides, and one or both vibrated horizontally by means of a pronged or double shaker.

2d, An eccentrically-journalled grate, with its rear side lying on the front part of a like grate, and so constructed for dumping that, as the rear part of the back grate turns upward, the rear part of the front grate falls downward.

72,755.—MANUFACTURE OF STEEL AND IRON.—Jas. Park, Jr., Pittsburgh, Pa.

I claim producing cast steel of mild or low temper, or wrought iron, in the manner substantially as hereinbefore described, by first melting partially-carbonizing wrought iron in the ordinary or any other suitable furnace, and then adding to and melting in it highly-heated wrought iron, so as to reduce the percentage of carbon in the mass, and repeating the process, if necessary, until the carbon is sufficiently reduced or entirely removed.

72,756.—HARVESTER.—T. E. Platt (assignor to himself and George D. Lambert), Newtown, Conn.

I claim the arrangement of the clutch, H, upon a shaft, E, and in connection with the cutter-bar, so that by means of the said clutch, the cutter-bar may be raised, substantially as set forth.

72,757.—TOBACCO-CUTTER.—A. J. Rayner, Buffalo, N. Y.

I claim, 1st, A tobacco-cutting machine, having two knives, E and F, upon one hinged cutter-frame, B, arranged and operating substantially as herein described and for the purpose set forth.

2d, In combination with the above, the guide-rail, D, and the projection, C', upon the cutter-frame, B, constructed and operating in the manner and for the purpose substantially as described.

72,758.—CASTER STAND.—Chas. Reistle, Brooklyn, N. Y.

I claim, as a new article of manufacture, the table caster above described, consisting of the base, a, the ridges, f, the standard, b, and brackets and springs, d, as specified.

72,759.—LANTERN.—James O. Smith, New York city.

I claim, 1st, The combination of the guard, having a groove, a, in its upper part, with the top of the lantern, having slotted holes, d, to receive said guards, as described, said guards being attached to the base of the lantern by soldering or equivalent means, by which combination and construction of parts the guards are firmly secured to the lantern, and without liability of being detached at the top by heat.

2d, The formation of the projections, C, upon the base of the lamp, as described; that is to say, said projections being made a part of said glass body, and so formed as to accomplish each of the several results set forth.

72,760.—CONSTRUCTION OF HOT-WATER BOILERS.—Henry Steeger, New York city.

I claim the convex head, b, secured to the boiler, a, by the ribs and grooves at c, in combination with the head, d, setting within the lower end of the boiler, and its flange, i, secured by ribs and grooves at o, as and for the purposes set forth.

72,761.—FASTENING FOR BOTTLE-STOPPER.—Robt. S. Stubbs, Dover, N. H.

I claim the said bottle-stopper fastener, as composed of the curved yoke and the strap, constructed and applied together in the manner and so as to operate substantially as specified.

Also, the arrangement of the yoke and strap with the neck and cork of a bottle, in manner substantially as specified.

72,762.—SHINGLE CARRIAGE.—Charles Taft, Northbridge, Mass.

I claim, 1st, A shingle-carriage, to facilitate the shingling of roofs of buildings, constructed substantially as shown and described.

2d, The combination, with the hinged arms or pieces, E E, of the table, G, guard-boat, H, and pins, b b, substantially as and for the purposes set forth.

72,763.—CIRCULAR SAW MILL.—John Todd (assignor to himself and William P. Duncan), Bellefonte, Pa.

I claim, in combination with the hinged frame, H, for moving the friction feed and backing wheels into and out of action with the drive wheel and its shaft, the pivoted weighted lever, K, jointed to the frame as described, and its support, M, for holding both of said wheels out of action, substantially as and for the purpose described.

72,764.—LAMP.—A. P. Tyler, Cleveland, Ohio.

I claim, 1st, The globe, A, as constructed with the conical chamber, D, tubes, C, one or more, in the manner as and for the purpose substantially described.

2d, The herein described mechanical power or apparatus for producing a current of air, when arranged and constructed as shown and described, in combination with the tubes, C, chamber, D, and globe, A, all arranged in the manner and for the purpose set forth.

72,765.—WINDOW-SASH SUPPORTER.—F. N. Violet, Fond du Lac, Wis.

I claim the two cams, h h, with their cogs or gears, m m, in combination with the case and spring, when the whole is constructed and arranged to operate in the manner and for the purpose herein set forth.

72,766.—BOLT FOR SAW-FRAMES, ETC.—F. Washbourne, New York city.

I claim, as a new article of manufacture, a headed bolt, made, as above described, of wrought metal, the head and shank being made in separate pieces, and afterwards brazed or soldered to each other, as specified.

72,767.—CURTAIN FIXTURE.—Herman Wocher and Benedikt Geiger, Philadelphia, Pa.

We claim the spring, E, in combination with the hollow weight, C, and guide-rod, D, substantially as and for the purpose set forth.

72,768.—CURTAIN FIXTURE.—Herman Wocher and Benedikt Geiger, Philadelphia, Pa.

We claim, 1st, The combination of the curtain, A, roller, B, counterbalancing weight, E, elevating cord, D, attached directly to the weight, E, and a guide, whereby said weight is confined to a specific path, all arranged to operate substantially as and for the purposes set forth.

2d, Also, the combination, with the curtain, A, and its essential accessories, of a hollow or chambered supporting weight, E, adapted to admit of graduation, substantially as and for the purpose set forth.

72,769.—LET-OFF MECHANISM FOR LOOM.—Edward Wright (assignor to L. J. Knowles & Brother), Worcester, Mass.

I claim the combination, with the pawl and lever and springs, G, of the guide and feed-finger, N, mounted upon the lay, substantially in the manner and for the purposes set forth.

72,770.—WIRE DISH-STAND.—E. P. Woods and Daniel Sherwood (assignors to Woods, Sherwood & Co.), Lowell, Mass.

We claim, 1st, The arrangement of the bars, A, provided with the legs, a, and inclined sides, B, substantially in the manner shown and described, and for the purposes specified.

2d, The arrangement of the bars, A, as described, in combination with the spiral, c, substantially as described, and for the purposes specified.

72,771.—KNITTING MACHINE.—Walter Aiken, Franklin, N.H.

I claim the combination of the latch, Q, and stud, r, or their equivalents, with the two cam-bars, D P, of the rib and plain-work needles

Also, the combination and arrangement of the swing-arm, N, or its equivalent, with the frame, A, and its supporting mechanism and cam-bar, P, of the rib-needles, the same being to enable such rib-needles, with their supporting mechanism and cam-bar, to be turned away from the plain-work needles in manner as set forth.

Also, the combination for holding and releasing the shipper-shaft, and regulating the length of the plain and ribbed work of a stocking-heel to be produced, as described, such combination consisting of the worm, V, the worm-gear, W, its studs and spring, the lever, X, its latch, e', latch-lever, b', and spring, d', and the bolt, z, and its operative lever, a'; the shipper-shaft being provided with a notch or groove, or its equivalent, for reception of the bolt, as set forth.

72,772.—COVERING FOR FOOT-BALLS.—H. A. Alden, Mattewan, N. Y.

I claim, 1st, A foot-ball composed of a bladder, or its equivalent, capable of being distended by inflation, provided with a separate covering or casing of vulcanized rubber, whether combined or not with a cloth backing, substantially as and for the purposes set forth.

2d, A foot ball formed of a hollow rubber ball, provided with a suitable inflating apparatus, and covered by an an outer casing of vulcanized rubber, with or without a cloth backing, substantially as and for the purposes herein described.

72,773.—POTATO-DIGGER.—Peter Antonidus, Freehold, N. J.

I claim, 1st, The combination of the plough, F, axle, B, and hounds, D, when the latter are so connected with the axle by hinged joints, that the depth of the cut may be regulated without interfering with the horizontal position of the hounds, substantially as set forth.

2d, The combination of the plough, F, bar, H, axle, B, hounds, D, plate, K', and lever, K, constructed and arranged substantially as set forth.

3d, The combination of the plough, F, bar, H, axle, B, hounds, D, and set-screw, L, constructed and arranged substantially as and for the purpose set forth.

72,774.—SPIRIT METERS.—Moritz Augenstein, New York city.

I claim, 1st, The horizontal measuring-drum, E, containing the chambers, G G G, each being constructed and arranged upon the shaft, d, in combination with the semicircular tube, c, or any equivalent therefor, in the manner and for the purposes substantially as herein described and set forth.

2d, Also, the vertical chamber, B, and vertical tube, C, arranged and combined, by means of the horizontal tube, a, or any equivalent therefor, in the manner and for the purposes substantially as herein described and set forth.

3d, Also, the vertical tube, D, containing the spirit-strainer, b, arranged therein, and having at or near its lower end the horizontal or semicircular tube, c, and which tube, D, is so arranged in combination with the vertical tube, C, as to receive the spirits or liquor passing over and through the spout, l, into or near the upper end thereof, in the manner and for the purpose, substantially as herein described and set forth.

4th, Also, the channel or trough, o, and vertical tube, p, connected therewith, and extending to the receiving chamber, I, and the brushes, h h, arranged upon the end of the measuring cylinder, E, and combined and operated in the manner and for the purposes substantially as herein described and set forth.

5th, Also, the discharging chamber, H, combined with the horizontal measuring drum, E, with opening, T, arranged above the discharging pipe or tube, in the manner and for the purposes substantially as herein de cribed and set forth.

6th, Also, the combination of the horizontal measuring drum, E, with the registering device, J, in the manner and by the means substantially as herein described and set forth.

7th, Also, the receiving chamber, I, in combination with the discharge tube, n, and with the door, K, each being arranged in the manner and for the purposes substantially as herein described and set forth.

8th, Also, the meter frame or box, o, with the top, L, having thereon the tongues, P P, extending around the top of said box, o, and firmly secured thereto by means of the screw-pins or bolt, K, having an opening in each of the respective heads thereof, so as to receive and pass through the same some suitable ribbon or cord, so that the same may be sealed with government seal, in the manner and for the purposes substantially as specified.

9th, Also, the conducting of spirits or liquor, after the same shall have been measured in the manner substantially as aforesaid, from the said chamber, H, into the receiving chamber, I, so that the average quality thereof may be ascertained for any given time of the operation of manufacturing of spirits or liquor, in the manner and by the means substantially as herein described and set forth.

72,775.—HARVESTER RAKE.—Cornelius Aultman, Canton, O.

I claim the combination of the rake-stale, linked to a revolving post, with a pivoted arm and roller, that are operated by a camway, and controlled by a spring, for the purpose of giving said rake a motion along or near to the sides and ends of an oblong or irregular-sided platform, in addition to its circular motion, substantially as described.

72,776.—DEVICE FOR HOLDING GLASS.—B. H. Badger, New York city.

I claim the device for holding glasses, consisting of the jaws, A B, knob, C, ring, f, fingers, a b, spring, c, wires, d, provided with hooks, e, substantially as and for the purposes set forth.

72,777.—METHOD OF ALTERING THE CALIBER OF MUSKET AND OTHER GUN-BARRELS.—C. E. Bailey, Springfield, Mass., assignor to Allen Patent Fire-Arms Manufacturing Company, New York city.

I claim the insertion of an inside tapered tube, A, in a seat formed for it by boring out the barrel, B, of a gun or rifle in such a manner that it tapers inside from breech to muzzle, and corresponds with the outside tapered surface of the tube, A, and firmly securing the latter in place by brazing at the muzzle and other parts, substantially as and for the purpose described.

72,778.—CLUTCHES FOR OPERATING HORSE HAY FORKS.—D. B. Baker, Bollersville, Ohio.

I claim, 1st, The combination of the pivoted bars, P P, supporting rod, J, and stop, R, with each other and with the short arms of the clutch, A A, as a support for said clutch and also to produce an automatic action, substantially as and for the purpose specified.

2d, The hook, d, in combination with the above so arranged that when the clutch is supported by means of the rod, J, the weight or draft at the hook, d, will always swing the long arms of the clutch, A A, in one direction which when being arrested by the stop, R, leaves one arm in a vertical position so as to facilitate the process of changing the point of bearing which produces an automatic action, substantially in the manner specified.

72,779.—CARRIAGE CLIP.—L. J. M. Baker, Enon, Ohio.

I claim the combination of the shaft iron, F, plate C, bolt, E, and hooks, B', substantially as and for the purpose set forth.

Also the combination of the plate, C, and spring, D, substantially as and for the purpose set forth.

72,780.—CULTIVATOR.—J. T. Baltimore, Marble Rock, Iowa.

I claim, 1st, The combination of the beams, G, pivoted at their front ends to the arms, E, of the frame, C, and passing through the slotted arms, F, with the beams, H, pivoted to their inner sides, substantially as described.

2d, The combination of the elbow levers, L, cross bars, M and K, with the standards, I, connected to the beams and arranged for operating the shovels substantially as described.

72,781.—SHEEP SHEARING AND TAGGING TABLE.—Hollis Barr, Brecksville, Ohio.

I claim the adjustable arms, E E, having the cords, f f, attached in the manner described in combination with the shearing and tagging table, the several parts being constructed and operating in the manner as and for the purpose set forth.

72,782.—CLOTHES DRYER.—C. B. Bennett, Amboy, Ill.

I claim the combination of the standards, a, with the shears, b, and bars, c, substantially as described and shown by the specification connected herewith.

72,783.—COMBINED CORN SHELLER AND SEPARATOR FEEDER.—Jacob Bernheisel, Sen., Green Park, Pa.

I claim, 1st, The feeder, J, with the grate, L, as combined when constructed and operating as herein described and for the purpose set forth.

2d, Also the combination of the grated concave, N, with its spiral springs, P, and sleves, E and G, when constructed and operating as herein described and for the purposes set forth.

3d, Also the feeder, J, grate, L, concave, N, springs, P, and plate, R, when arranged and combined with the cylinder, M, sleves, E and G, and fan, B, as herein described and for the purposes set forth.

72,784.—ADJUSTABLE HASPS AND HOOKS FOR DOORS.—William Bisbee and Fleming G. Hearn, Yreka, Cal.

We claim, 1st. The spring, C, in combination with the box hasp, B, for self-adjustment in contraction and expansion of doors, etc., substantially as above set forth and described.

2d, The said spring, C, in combination with the adjustable hook, F, and hasp, B, substantially as and for the purpose above set forth and described.

72,785.—DEVICE FOR DRAWING WICKS THROUGH BURNERS.—Friedrich A. Blatterlein, West Meriden, Conn..

I claim the strap, A, doubled upon itself to form two sides with the teeth, a, upon their lower ends when such sides are provided with one or more rows of perforations, b, for engaging with the ratchet wheel in the burner, whereby the wick is drawn through the latter, as herein shown and described.

72,786.—BURGLAR ALARM.—Lyman W. Blakeslee and A. D. Smith, Cincinnati, Ohio.

We claim the combination with the alarm, A, and the rod or trigger, E, of stationary curved tongue or catch, G, and hook, H, all applied and operating in the manner and for the purpose set forth.

72,787.—SEWER PIPE MACHINE.—Jacob Blank, Cuyahoga Falls, Ohio.

I claim the jointed knife or cutter, L, when arranged and operated by the spindle, J, pinions, K N, in combination with the die and cylinder, A, for the purpose and in the manner substantially as described.

72,788.—BAG HOLDER.—C. D. Brainerd, Danville, Vt.

I claim the combination of the spring bands, L, secured at one end to the sliding frame, C2, jaws, M, eyes, N, rods, O and Q, and treadle, R, all arranged and operating as herein described for the purpose specified.

72,789.—TRUSS FOR HERNIA.—A. F. H. Braun, San Francisco, Cal.

I claim the screw, a, having its bearing against the lever, D, the spiral spring, d, through which the screw passes, and the nut, b, for regulating the pressure of the pad in combination with the frame, C, and axis, D, substantially as and for the purpose described.

72,790.—METHOD OF MAKING EYELETS.—G. B. Brayton, Boston, Mass., assignor to himself and J. W. Hoard, Bristol, R. I.

I claim, as a new method of manufacturing eyelets, the cutting of sections from a metal tube and then forming these into shape, substantially as described.

72,791.—DOOR BELL.—A. T. Brooks, New Britain, Conn.

I claim the slotted hub plate, a, vibrating cams, c, cap, n, actuating spindle, b, with the bell plate and striking mechanism, substantially as and for the purpose described.

72,792.—MECHANICAL MOVEMENT.—A. W. Brown, Brooklyn, N. Y., assignor to himself and C. R. Squire, New York city.

I claim, 1st, The wheel, A, plate, A1, shafts, S1 S1, and cams, C C, or their equivalent, arranged to operate together in the manner and for the purpose substantially as described.

2d, The plate, A2, wheel, A3, pins, P P P P, and ribs, I I, arranged to operate together in the manner and for the purpose substantially as described.

72,793.—BOILER WATER GAGE.—N. H. Bundy (assignor to himself and E. Philbrick), New York city.

I claim the combination of the automatic valves, F F', constructed and operating substantially as described with the three-way cocks or valves, E E', controlling passages arranged substantially as described for action in concert when required with a blow-off cock, m, essentially as herein set forth.

72,794.—PREVENTING INCRUSTATION OF STEAM BOILERS.—Samuel G. Cabell, Quincy, Ill.

I claim, 1st, The application to steam boilers of an electrical conductor arranged to convey the electricity from within the boiler or steam space to the exterior of the boiler said conductor being insulated where it passes through the shell of the boiler, substantially as described.

2d, In combination with an electrical conductor arranged as described the use of permanent magnets located within the boiler, substantially as set forth.

72,795.—CART.—James W. Cahoon (assignor to Burgess B. Long), Philadelphia, Pa.

I claim the employment of lifting cams or eccentrics to elevate the forward end of a vehicle, substantially as and for the purpose described.

Also as a locking device for the forward end of a cart or other vehicle a cam or eccentric and a connecting rod or strap, substantially as shown and described.

Also the combination with a cart-tilting device substantially such as shown and described of a brake, as and for the purpose set forth.

72,796.—ANTI-FRICTION AXLE AND JOURNAL BOX.—James H. Carkeet, Montgomery, Ala.

I claim the application of hollow cylinders to the relief of friction, as above substantially described and set forth.

72,797.—FORM BLOCK FOR SHAPING BASKETS.—Henry Carpenter, New York city.

I claim a form block for shaping or manufacturing peach or other conical baskets composed of two parts, one fixed and the other movable, connected by a hinge, and arranged to operate substantially as shown and described.

72,798.—BATH BOILER.—E. H. Chapman and T. M. Hammett, Philadelphia, Pa.

We claim the vertical boiler, A, having internal pipes, a c and d, and an opening, l, arranged in the manner and for the purpose described.

72,799.—COMBINED CULTIVATOR AND SEEDING MACHINE.—Castle Churchill, New Hartford, Iowa.

I claim the seed-distributing device composed of the plates, b, fitted between the fixed and the movable heads, a a', on shaft, F, in combination with the hopper, I, and the scattering wheel, K, on shaft, J, and the spout or trough, H', all arranged for joint operation substantially in the manner as and for the purpose set forth.

72,800.—SWIFT.—Eben M. Coffin, Woburn, Mass.

I claim the improved swift as made of the two forked arms, A A, and the two clamps, B C, arranged and combined substantially in manner as specified.

72,801.—ROTARY CRANE.—J. S. Coffman, Greenville, Ind.

I claim, 1st, The axle, C, having on it a screw thread and the nut, D, as a guide for the rope, F, substantially as shown and described and for the purposes set forth.

2d, Also the rotating windlass frame, B, in combination with the wheel, W, axle, C, nut, D, and stand, A, substantially as shown and described and for the purposes set forth.

72,802.—BREAST PAD.—Richard Collins, Chicopee, assignor to Aaron G. Lord, Springfield, Mass.

I claim, 1st, An inflatable pad having a rigid base and a flexible front, substantially as herein described.

2d, An inflatable dress fitter or pad having a rigid base and flexible front, neck, c, and the inflating tube, i, all constructed and operating substantially as and for the purposes herein set forth.

72,803.—BREECH-LOADING FIRE-ARM.—Loughlin Conroy (assignor to himself an 1 Tristram Dodge Vanderveer), New York city.

I claim, 1st, The combination of the breech block, hammer, trigger, and trigger guard hung upon a common center pin when the trigger guard is so constructed in connection with the holding or recoil block as to operate thereon and on the breech block, substantially as and for the purpose described.

2d, The combination of the hammer with the trigger when hung upon a common center pin and arranged to operate in connection with a spring, or its equivalent, substantially as described.

3d, The cartridge retractor formed of two parts, R and T2, the latter pivoted at its forward end to the center, or nearly so, of the part, R, and its rear end pivoted to the upper and forward portion of the breech block, the part, R, provided with a cam upon its forward end corresponding to a suitable notch cut in the under side of the barrel, all constructed and operating as herein shown and described.

4th, The arrangement of the recoil block, M, with its curved arm in combination with the spring, b3, by means of which the breech block is supported and the guard lever kept in position when the breech is closed, as herein shown and described.

5th, The hook, b, attached to the lever guard in connection with the pin, a, by means of which a drop motion is obtained at that point so that when the lever guard is pulled downward to open the breech it comes in contact with the curved arm of the recoil block, M, and by the time the hook, b, catches upon the pin, a, the recoil block is raised sufficiently to permit the breech block to pass under it the breech being opened by continuing the pull on the lever guard, as herein shown and described.

72,804.—FRUIT PICKER.—Peter Conver and Samuel Conver, Yates City, Ill.

We claim the pectinated crown, d, and body, A, as formed and constructed in combination with bandle, D, and bag, C, when all are arranged in the manner herein set forth and described.

72,805.—BEEHIVE.—G. L. Conwell, Knoxville, Iowa.

I claim, 1st, The under section, A, forming a base for the hive and provided with the drawer, D, opening at either side and the drawer, E, opening at the back, said section having projecting inclined front with opening, x, and screen, b, the whole constructed and used in the manner and for the purposes set forth.

2d, The combination of the sections, A B C, with their drawers, honey frames, and boxes, provided with their communicating spaces and ventilation, their several parts constructed, arranged, and used, in the manner and for the purposes specified.

72,806.—TRUCK FOR TRANSPORTING STONE.—Thomas V. Cook, Lancsboro, Pa.

I claim, 1st, A metallic shoe, s, with front and back wings, or projections, or their equivalent, bent so as to form an angle with each other, or to form a bend, substantially as shown and described, and for the purposes set forth.

2d, The shoe, s, in combination with the planks, C D, and F, substantially as shown and described, and for the purposes set forth.

3d, A stone boat, composed of the shoe, s, and any planking, substantially as shown and described, and for the purposes set forth.

72,807.—WINDOW SASH STOP.—Richard H. Cooper, St. Louis, Mo.

I claim the bolt socket, A, whole as to its top, and provided with no slot anywhere except at its end, and having an interior stay or guide partition, a, when combined and arranged with the spring bolt, C, having a stop pin, c, and tongue, c1, arranged to slide in the notch, c2, and substantially in the manner set forth.

72,808.—BEEHIVE.—William Courtney, Richview, Ill.

I claim, 1st, In combination with the frames forming the main hive, H, as described, the perforated comb-dividers, I, constructed and arranged substantially as set forth.

2d, The combination of the main hive, H, and surplus honey box, G, when respectively constructed and arranged within the external case to operate in conjunction, substantially as set forth.

3d, The combination of the main hive, H, surplus honey box, G, and perforated cover, F, arranged in relation to one another and the external case, substantially as and for the purpose set forth.

4th, A beehive, constructed with the parts, A B C D E G, and H, arranged substantially as set forth.

72,809.—SUPPLY VALVE FOR WATER CLOSET.—Hugh H. Craigie, New York city.

I claim the water chamber, o, in combination with the valve, c, when said water chamber, o, is placed on the supply side of the valve, and arranged substantially as specified, so that the water is ejected from said chamber as the valve closes, for the purposes specified.

Also, a diaphragm valve, g, placed between a moving piston, k, and the valve, e, to be controlled substantially as set forth.

72,810.—WATER SUPPLY FOR WATER CLOSET.—Hugh H. Craigie, New York city.

I claim, 1st, A water way, b, formed in the bottom of the cistern, between the inlet valve, e, and the outlet pipe, c, in combination with a covering plate, introduced substantially as set forth.

2d, The valve, e, seat 5 and supports, constructed as specified, in combination with the cistern, a, to which it is attached by the ends passing under the cleats, f, as set forth.

3d, The service box, f, applied inside the cistern, and rising above the bottom thereof, in combination with the supply valve, e, substantially as and for the purposes set forth.

4th, The service box, f, attached as set forth, in combination with the water way, b, and supply valve, e, as and for the purposes specified.

5th, The adjustable arm, k, and bracket, l, for the fulcrum of the lever, g, in combination with the valve, e, and cord or wire, substantially as and for the purposes set forth.

6th, The arm, p, extending from the lever, g, in combination with the vales o and e, as and for the purposes specified.

7th, The tube, i, passed through the bottom of the cistern, and secured by a flange and nut, in combination with the lever, g, and valve, as and for the purposes set forth.

8th, The supply valve or cock, r, placed in the bottom of the cistern below the water, in combination with the lever, t, and float, u, adjustable on its stem, as and for the purposes set forth.

72,811.—CORN HARVESTER.—Cyprian U. Crandall, Galesburg, Ill.

I claim, 1st, Constructing a corn harvester or picker, with feelers or conveyers, A A, for raising the fallen stalks of corn to an upright position, substantially in the manner as described.

2d, The combination of the gatherers, B B, with the feelers or conveyers, A A, substantially in the manner and for the purpose as herein described.

3d, The construction and arrangement of the rollers, C' C C, substantially in the manner and for the purpose as herein described.

4th, The arrangement of the rubber spring with the rollers, when the rollers are constructed and arranged substantially in the manner and for the purpose as herein described.

5th, The wires or rods, d d, as arranged, substantially in the manner and for the purpose as herein described.

6th, The arrangement of the endless carrier, D, with the rollers, when the rollers are constructed and arranged substantially in the manner and for the purpose as herein described.

7th, C onstructing a corn harvester with a swinging carrier, I, substantially in the manner and for the purpose as herein described.

8th, The adjustable tongues or poles, M M, handles, upright bars, N N, and rods, O O, substantially in the manner and for the purpose as herein described.

9th, The feelers or conveyers, A A, rollers, C' C C, spring, c, wires or rods, d d, carriers, D and I, and poles, M M, all as arranged and combined, substantially in the manner as described.

72,812.—MILLSTONE BUSH.—C. Custer, Philadelphia, Pa.

I claim, 1st, The millstone bushing, constructed as described, consisting of the segmental wedges, C, having chambers, a, in the upper ends, placed in the four corners of the shell, B, with their concave faces fitting against the spindle, and supported by the adjustable radial plates, b, upon the under side of said shell, and adjusted by the reverse wedges, D, fitting against the wedges, C, in the same radial recesses, and adjusted from the under side, by means of the screw bolts, c, and nuts, e, as herein described, for the purpose specified.

2d, The combination and arrangement of the hollow wedges, C, reverse wedges, D, radial slides, b, screw bolts, c, shell, B, follower, h, and chamber, g, as herein described, for the purpose specified.

3d, The radial slotted slides, b, in combination with the hollow segmental wedges, C, when such slides support said wedges by passing across their inner corners, as herein set forth for the purpose specified.

72,813.—EAVES TROUGH.—John P. Dauth, Reading, Pa.

I claim the holder, represented in figs. 1 and 2, intended to pass around the trough, and hold it tightly or loosely, as it may be wanted, and from which the trough can be removed and replaced at will, by taking out the bolt at A. fig. 1, or detaching at A, fig. 2.

72,814.—TESTER FRAME FOR BEDSTEAD.—Johnson C. Davis, Montgomery, Ala.

I claim the tester frame herein described, consisting essentially of the ring, b, transverse arms, c, and staff, a, the latter, at its upper end, forming a rigid connection between the ring and arms, and thereby a rigid support for the ring, in the manner described.

72,815.—ADJUSTING KNOBS TO SPINDLES.—Alfred Dawes, Hudson, Mass.

I claim, 1st, Knobs and spindles, screwing the one into the other by screw threads of different degrees of fineness on the two ends.

2d, In the shank of door knobs, that screw upon their spindles, the making two or more screw holes for the reception of the set screws, so placed in the circumference that no two are opposite, at the same time, to the faces of the spindles.

3d, The making one end of the spindle, for door knobs, with a different number of sides from the other.

4th, The combination of door knobs and spindles, screwing the one upon the other, with the spindle having a different number of sides, and screw threads of different degrees of fineness in the two ends, and having one, two, or more screw holes in the shank of the knobs, to receive the holdfast screws, all for the purposes and in the manner substantially as described.

72,816.—ALCOHOL AND SPIRIT STILL.—H. G. Dayton. Maysville, Ky.

I claim, 1st, Carrying the liquid, with which a still is to be supplied, through the condensing vessel, B, for the purposes of moderately heating it by the rising vapors, and for thus preparing it for the still, substantially as herein shown and described.

2d, Providing the vessel, B, with a crown plate, C, by which the heavy vapors are separated from the spirits, and by which the condensed spirits are prevented from falling back into the still, substantially as herein shown and described.

3d, The annular trough, b, when formed on the inside of the vessel, B, in combination with the crown plate, C, all made and operating substantially as and for the purpose herein shown and described.

4th, The vessel, B, provided with a trough, b, crown plate, C, cooling coils, G, and discharge pipes, d and g, made and operating so that the finest are separate from the medium spirits, as set forth.

72,817.—PROCESS OF MAKING SOLUBLE BLUEING FOR USE IN LAUNDRIES AND BLEACHING.—James H. Dilks (assignor to C. T. Raynolds, & Co.), New York city.

I claim the process, substantially as above described, of making soluble Prussian, Paris, or Chinese blue in lumps or powder.

72,818.—LUMP BLUE FOR USE IN LAUNDRIES AND IN BLEACHING.—James H. Dilks (assignor to C. T. Raynolds & Co.), New York city.

I claim, as a new article of manufacture, a soluble blue in lumps, made substantially as above described.

72,819.—WASHING MACHINE.—Ellis W. Dixon, Forest Grove, Oregon.

I claim the open dasher, consisting of the cross bar, D, side pieces, a, and slats, b, in combination with arms, C, shaft, B, frames, F, cross bars, d, uprights, b, box, A, and clocks, E, all arranged and operating as described.

72,820.—AIR PUMP.—Thomas Doane, Boston, Mass.

I claim the eduction valve, D, arranged to yield and operate substantially as described, in combination with a piston, C, and cylinder, F.

72,821.—AXLE BOX.—Louis A. Dochez, New York city.

I claim, 1st, The arrangement in the axle box, A, of the concave false bottom, F, having central opening, vessel H, oil chamber, G, pads, J, and wicks, I, as herein described for the purpose specified.

2d, The vessel, H, fitted through a hole in the false bottom, F, into the oil chamber, G, and provided with holes near the upper edge, made and arranged as described, for the purpose of collecting the drippings from the axle, and of separating the dust and impurities from the oil.

3d, The lubricating pads, J, secured to concave blocks, K, which are provided with stem or ribs, c, guided in inclined grooves, substantially as and for the purpose herein shown and described.

4th, An auxiliary oil or grease reservoir, M, arranged above an axle in a journal box, and provided with a fusible plug which will melt by the heat of the axle, when the same is no more supplied with lubricating substance, as set forth.

5th, The oil chamber, G, vessel, H, wicks, I, pads, J, and blocks, K, when arranged as described, in combination with the perforated block, L, hollow cover, C, of axle box, and with the plug, e, which is soluable by the heat of the axle, when the same is no more supplied with oil, all made and operating substantially as herein shown and described.

6th, The plate, E E', when arranged as described, and when combined with the spring, s, grooved axle box, A, and axle, B, all made and operating substantially as herein shown and described.

72,822.—PORTABLE MILL.—Silas Dodson, Jersey City, N. J.

I claim the arrangement of the burr, N, adjustably secured to the cross bars, H, of the toothed disks, G, revolving in one direction, and the burr, O, upon the longitudinally adjustable shaft, B, revolving in independent bearings in the opposite direction, said shaft carrying the adjustable conveyers, S, as herein shown and described.

72,823.—CLOTHES PIN.—William M. Doty (assignor to R. C. Browning), New York city.

I claim, 1st, A clothes pin, composed of a combined hook and wedge, arranged for operation substantially as herein described, so that, by forcing down the wedge, the rope or line upon which the hook is placed will be jammed and held tightly between the said wedge and the hook, as and for the purposes set forth.

2d, The combination with the slotted wedge, of the skeleton wire hook, having the ends which straddle the wedge united by a strip or plate, fitting and capable of sliding within the slot in the said wedge, substantially as and for the purposes set forth.

72,824.—DULCIMER.—Ezra Durand, Norwich, Conn.

I claim the combination of the perforated sounding post, E, perforated sounding board, C, perforated center bridge, I, and notched bass bridge, G, the whole constructed substantially as herein described, for the purpose specified.

72,825.—APPARATUS FOR CARBURETING COAL GAS.—Wm. A. Eareeman and Robert W. Gray, Pittsburg, Pa.

We claim, 1st, An improved apparatus for carbonizing and saving gas for illuminating purposes, constructed as described, and operated in connection with a barrator and heater, in the manner and for the purpose set forth.

2d, An upper chamber, E, in combination with the pipe, I, button valve, a, shaft, b, and set screw, c, all constructed and operated as set forth.

3d, The perforated partition, d, perforated pipe, G, in combination with the chamber, D, and its subdivisions, D' D", constructed and operated substantially as described.

4th, The fluid line, J, in conjunction with the pipe, I, and chambers, E and D D' D", constructed and operated as set forth.

5th, The employment of finely carded wool as the interposing fibrous material, in the manner and for the purpose set forth.

72,826.—STUMP EXTRACTOR.—Jas. Elliot, New York city.

I claim, 1st, The combination of the fork, H, with its handle, c, with the chain, G, T-shaped strut, F, and windlass, B, as herein described, for the purpose specified.

2d, The stump extractor constructed as described, consisting of the lever, D, windlass, B, hand wheel, C, chains, E G, strut, F, and fork, H, constructed and arranged as described, whereby the fork, H, is depressed, and the windlass operated to extract the stumps, as herein shown and described.

72,827.—FOOD FOR STOCK.—Davis Embree, Dayton, Ohio.

I claim, 1st, The mode of preparing distillers' slops for food, by adding alkaline substances in quantities sufficient to neutralize the acids in the slops, and no more.

2d, The mode of restoring to distillers' slops, thus prepared, the starch and saccharine matter taken out in the process of distillation, by steeping coarse animal food in the hot slops, substantially in the manner set forth.

3d, The mode of preparing saturated slops from meal, by the application of steam to a mixture of coarse animal food and meal, substantially in the manner set forth.

72,828.—HEAD BLOCKS.—Philip Estes, Leavenworth, Kansas.

I claim, 1st, The lever, D, provided with eccentrics working on the shaft, s, upon each side of the pinion, C, for clamping the knee, B, upon the bearer, A, as herein shown and described.

2d, The combination of the open rack, a, pinion, C, knee, B, forked lever, D, pawls, c, ratchet wheel, E, dogs, d, segments, e, and adjustable stop, g, as herein described, for the purpose specified.

72,829.—SEWING MACHINE.—John Fanning, Brooklyn, N. Y., assignor to John S. Andrews, New York city.

I claim the movable finger, o, in combination with the looper, h, and lever, k, to which motions are given by the lever, f, and cam, 5, as and for the purposes specified.

72,830.—RENDERING ARTICLES INCOMBUSTIBLE.—Ambrose G. Fell, Brooklyn, N. Y.

I claim the application of the compound herein described to wood, textile fabrics, paper, and all analogous substances, substantially as described for the purposes specified.

72,831.—CHECK AND DRIVING REIN.—E. R. Ferry, New Haven, Conn.

I claim the combination of the check rein, d, and driving rein, b, with the bit of the bridle, when the said check rein passes through the eyes, a, thence directly to the bit, and the whole constructed and arranged so as to operate in the manner described.

72,832.—TRACE BUCKLE.—Charles Fillmore (assignor to himself and George Washer), Romeo, Mich.

I claim the buckle frame, A, and the plates, B and D, constructed and used together, with the tugs, E and F, substantially as and for the purpose set forth.

72,833.—CHILDRENS' CARRIAGES.—A. D. Fowler, Newark, N. J.

I claim, 1st, The clip, D, for children's carriages, constructed as described, consisting of the part, d1, upon the upper side of the arm, B, cast with a shoulder upon it, the outer end passing around and embracing the part, a', of the spindle, the part, d2, upon the under side of the arm, B, fitting against the shoulders of the part, d1, thereby forming a continuous bearing, as herein set forth, for the purpose specified.

2d, The hollow spindle, A, cast in one piece, and provided with the part, a', by which it is secured in the bearing of the clip, D, as herein set forth, for the purpose specified.

72,834.—MACHINE FOR SEPARATING WHEAT FROM GARLIC. Samuel Gantz, Beaver Creek, Md.

I claim, 1st, The grooved incline, S, having the slots, s s, and the apparatus, a a, arranged as shown, and the whole constructed and operating substantially as and for the purpose described.

2d, The guide block, I, having the arches, i i, substantially as and for the purpose specified.

3d, The grooved gum roller, D, when used in a separating machine, substantially as and for the purpose set forth.

4th, The wheel, C2, having the grooves, c c, terminating in the channels, c' c', substantially as and for the purpose shown.

5th, The combination of the incline, G, guide, I, gum roller, D, wheel, C2, and rake, M M' m, substantially as and for the purpose described.

6th, The combination of the wheel, C2, and toothed roller, E', substantially as and for the purpose shown.

72,835.—CULTIVATOR.—R. Garter, Grand Rapids, Mich.

I claim 1st, The arrangement of the wheels, E E, hung on the inside of the frame beams, A A, with an adjustable cast iron slide, b, working in uprights, c c, having serrated or toothed faces for fastening it at any hight, with corresponding serrated washers, h h, on the bolts, d, by the crank nuts, e, substantially as and for the purposes herein described.

2d, The sliding adjustable wipers, k, in combination with the wheels, E E, constructed and operating as and for the purposes herein described.

3d, The cast iron loop, n, and clevis, n', combined with the draught pole, F, constructed and applied substantially as set forth.

72,836.—ENVELOPE.—J. C. Gaston, Cincinnati, Ohio.

I claim an envelope having the perforations in the end flaps or back, or both, so located as to be covered and concealed by the closing flap, C, when closed, substantially as and for the purpose set forth.

72,837.—HORSE HAY FORK.—John Gilmore, Phœnixville, Pa.

I claim, 1st, The combination of the jaws, J J, sides, A A, sliding rods, C C, connecting rods, R R, cranks, m m, shaft, M, arm, m', snap, s, spring slide, s', and handle, D, when the said parts are constructed, arranged and combined substantially in the manner and for the purposes specified.

2d, In a horse hay fork of the within described construction, the projecting curved lugs, e, in combination with the sliding rods, C C, and jaws, J J, the latter having the shoulder, v, so formed that when the jaws are retracted it will rest upon the upper side of the lugs and support the jaws, J J, independently of their pivots, substantially in the manner described.

72,838.—MACHINE FOR TRIMMING STRAWBERRY VINES.—Wm. C. Goodwin, Hamden, Ct.

I claim, 1st, The combination of the rotary cutting blade with the fixed cutting blade, when constructed, arranged and fitted for elevating and cutting the runners or creeping vines, substantially as herein described and set forth.

2d, The combination of the rotary cutting blade with the pinion and internal gear, or their equivalent, when constructed, arranged, and the blade caused to rotate in the manner and for the purpose substantially as herein described and set forth.

72,839.—HARVESTER RAKE.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, The ball and socket connection between the vertical rake shaft and its driving mechanism, substantially as described.

2d, The arrangement of the ball and socket joint in the rake driving mechanism, in line with the hinge or joint of the cutting apparatus or platform, substantially as described.

3d, The driving pulley and chains, in combination with the coupling arm or its equivalent, and the rake standard, arranged substantially as described.

4th, The separate inclined ways, e e', for regulating the depression of the rake and reel arms independently of each other, as described.

5th, The friction rollers, f f', arranged to regulate the elevation of the rake and reel arms independently of each other, as described.

6th, The angular head, G, in combination with cap, D8, and inclined ways, e e', substantially as and for the purpose described.

72,840.—HARVESTER RAKE.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, The vibrating rake frame, or case, C2, provided with the tubular arm, C8, arranged and operating in combination with the vertical shaft, substantially as described.

2d, The rake shaft, D, provided with the crank arm, E, in combination with the tubular arm, C8, and the rake frame, C2, substantially as described.

3d, The horizontal track or way, b, provided with the cam switches, b2 b3, in combination with the reciprocating and vibrating lever, E2, connecting rod, E1, and crank arm, E, for giving the rising and falling movements to the rake, as described.

72,841.—HARVESTER RAKE.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, An overhanging reel and a independently revolving rake, supported at a point in rear of the cutting apparatus and between the driving wheels, substantially as described.

2d, A revolving rake and an independently revolving overhanging reel, arranged upon a common shaft or support, in combination with a sprocket wheel and reel driving gear, arranged upon the same support or shaft, substantially as described.

3d, The sprocket wheel, P1, located upon a rake shaft, arranged between the driving wheels and operated from a similar wheel on the end of the drive wheel axle by means of a chain, G, arranged substantially as described.

4th, An inclined reel shaft, supported at a point in rear of the cutting apparatus, in combination with the bent or angular reel arms, substantially as described.

5th, The hub, I', or its equivalent, intermediate between the bevel wheels on shaft, I, provided with the cap or guide, F, substantially as and for the purpose set forth.

6th, The combination of standard, B, arm, B1, bent shaft, I, revolving rake, A, and an independently revolving reel, arranged and operating substantially as described.

72,842.—MECHANICAL MOVEMENT FOR CONVERTING POWER INTO SPEED.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, The arrangement of a series of wheels with a wheel on and around one shaft or axle, whereby any desired number of revolutions can be produced, and any required power can be obtained for converting speed into power and power into speed for multiplying and transmitting motion, and for power machines for hoisting and other purposes, substantially as described.

2d, The arrangement of the hollow sleeves on the shaft, S, and in the journal boxes, U and U', on the frame, F, and posts, F', and the pulleys, P and P', constructed and operated in the manner and for the purpose substantially as described and shown.

72,843.—REVOLVING RETORT FOR ROASTING ORE.—Wm. F. Goodwin, East New York, N. Y.

I claim a corrugated retort, constructed in form and manner and for the purpose substantially as described.

72,844.—SPRING POWER REPEATING FIRE-ARM.—John Gordon, New London, Ct.

I claim the combination as well as the arrangement of parts for effecting the retraction of the hammer after a pull on the trigger, such consisting of the spring, f, and its wheel, C, the cord, l, and winding wheel, D, or the equivalent thereof, the hooked pawl, s, the escapement wheel, E, and its click, t, and ratchet, F, and the lever pawls, G H, applied to the trigger, A, and the main spring, d, as set forth.

72,845.—PADLOCK.—John B. Green, Darien, assignor to himself and J. A. Reed, Stamford, Ct.

I claim a padlock having a curved body, A, and straight latch, B, hinged together by the screw, a, and sockets, b, and otherwise constructed and arranged substantially as herein specified.

72,846.—COTTON GINNING MACHINE.—R. R. Gwathmey, Middletown, Ky.

I claim, 1st, The mode of hulling and ginning cotton into one same machine, and at the same operation, by means of one, two, or more ribbed aprons, combined with one, two, or more saw-cylinders, invariably driven or rotated in the direction shown by red ink arrows, x x', figs., plates 1 and 3, in the manner and for the purpose above set forth and described.

2d, The combination of wire cage cylinders, C' C", with saw cylinders, C and C', and ribbed aprons, E' J' and E J, the whole constructed and operated in the manner and for the purpose above set forth and described.

3d, The combination of ribbed cylinder, E B (plate 3), with top saw cylinder, C, and ribbed apron, E' J', and shoveller screw, S C, the whole constructed and operated for the purpose and in the manner above set forth and described.

4th, The combination of upper saw, C, with top apron, E J, and screw, S C, by means of which the cotton is hulled and rid of all dirt and trash, in the manner above set forth and described.

72,847.—PEAT AND BRICK MACHINE.—Eliphalet Hall, Dunnamora, N. Y.

I claim the presser and pusher, with or without the lever-arm and carrying-pawl, when combined together and arranged to operate with reference to the mold-wheel, A, substantially as and for the purpose specified.

72,848.—CORN HARVESTER.—L. B. Hamilton, Boston, Mass.

I claim, 1st, The combination and arrangement of the S-shaped cutters, U, spiral conveyors, J, fingers, K, and body, E, with box, C, as herein described for the purpose specified.

2d, The cylindrical-pointed fingers, K, in combination with the rotary S-shaped cutters, U, as and for the purpose specified.

72,849.—CARTRIDGE EJECTOR FOR BREECH-LOADING FIRE-ARMS.—Henry Hammond, Hartford, Conn.

I claim the combination of the unlocking bolt, a, and the stud, d, with the extracting bar, e, its notch, f, and the ejecting spring, s, constructed and operating substantially as herein described.

72,850.—SASH ADJUSTER.—P. H. Hardy (assignor to himself and E. M. Hardy), Terre Haute, Ind.

I claim, 1st, The adjusting box, C, with its movable stop plate, a, constructed, arranged, and operating substantially as herein shown and described for the purposes set forth.

2d, In combination with the adjusting box, C, connecting the upper and the lower sash together so that they will balance each other, substantially as described for the purposes set forth.

72,851.—SLED BRAKE.—J. L. Heffron, Marathon, N. Y.

I claim, 1st, The sliding plate, d, on the roller, B, for closing the slot, b, in the runner, when made and arranged as described, and when fitted between the two bars, c c, as set forth.

2d, The combination of the roller, B, fitted in the slotted runner, with the sliding plates, d, levers, f, semi annular levers, g, and adjustable dogs, h, all made and operating substantially as herein shown and described.

72,852.—WEEDING MACHINE.—Geo. H. Hess, Chicago, Ill.

I claim the machine, consisting of the inclined blades, A, attached to the central standard, C, and the latter secured to a hand frame, having a single wheel at the front and handles at the rear, all constructed and arranged substantially as herein described.

72,853.—TRUNK.—James A. House and Henry A. House, Bridgeport, Conn.

I claim, 1st, The combination, substantially as described, of the elastic shield or the metal clamp, for the purposes specified.

2d, A perforated metal clamp, through which an elastic boss or shield projects, and by which the shield is fastened to the trunk, substantially as described.

3d, The combination of the elastic boss with the metal plate, having claws grasping the boss, as shown in figs, 4 and 5.

4th, Clamping an elastic boss upon the head of the nail or screw which fastens the clamp in position, as described.

72,854.—LIGHTER AND ALARM.—Thomas N. Howell, Circleville, Ohio.

I claim, 1st, The lamp, A, constructed as described, and provided with the spring, E, in combination with the spiral match-holder, a", and the friction plate, G, as and for the purpose described.

2d, In combination with the above, the alarm apparatus, consisting of the stud, F, spring, f, nipple, f", and stop, f"', as and for the purpose described.

72,855.—KITE.—Edward I. Hughes, Pittsburg, Pa.

I claim the kite frame, constructed as described, consisting of the bent bar, A, saddle, B, curved operating bar, G, backbone, C, beak and sternum, D' tail bars, E, and wing bars, F, all constructed and arranged as described, for the purpose specified.

72,856.—FENCE AND TRELLIS HOOK.—D. S. Humphrey, East Townsend, Ohio.

I claim a cut hook-headed spike or nail, constructed as described and for the purpose specified, as a new article of manufacture.

72,857.—WELL TUBE.—Wm. B. Hutchinson (assignor to himself and Mitchell, Allen & Co.), Newbern, N. C.

I claim the combination of the conical gaze strainer, F, perforated inverted conical sand basket, D, and perforated pointed cylinder, A, having the openings, G, in the hollow bead near its lower end, as herein described, for the purpose specified.

72,858.—POLING HOPS.—Allen Ingalls, Hartwick, N. Y.

I claim the combination and arrangement of the poles, A, cross bars, C, and cords, D, as and for the purpose set forth.

72,859.—METALLIC COLUMNS FOR BRIDGES.—Almon B. Ives, Bloomington, Ill.

I claim the cast-iron column, A, consisting of two arms, B B, constructed as described, and provided with ribs or flanges, R R, cap, c, and foot or shoe, H, said arms bolted at the top and spread at the foot, and connected by one or more braces, D, substantially as and in the manner herein set forth, said column, A, to be used for abutments and piers in iron and wooden bridges, substantially as and in the manner herein described and specified.

72,860.—HORSE HAY FORK.—R. V. Jones, Canton, O.

I claim, 1st, The use of the cross bar, G, in combination with its arm, E, as and for the purpose specified.

2d, The strap, A, with its prongs or teeth, B, in combination with the bar, F, with its prong, J, and cross bar, G, and the arm, E, and cord, I, arranged and used as and for the purpose set forth.

72,861.—CAR BRAKE.—Jacob Katzenberg, N. Y. city.

I claim the jointed foot lever, J, pivoted to supports, K, attached to the platform, S, or railing, C, or to both, and connected with the brake rod, I, by a chain, L, passing around a friction pulley, M, substantially as herein shown and described and for the purpose set forth.

72,862.—DRESS HOOK.—Max A. Keilig, Boston, Mass.

I claim the formation of the hook tongue, a, with the shoulder-bend, e, as and for the purpose set forth.

72,863.—PORTABLE FENCE.—A. Labair, Pewaukee, Wis.

I claim a fence constructed as specified, and so devised that all the parts may be formed of the same kind of lumber, substantially as described.

72,864.—SCALE.—Ezra B. Lake, Bridgeport, N. J.

I claim the combination of a vibrating frame or beam of a scale, a graduated plate or plates, and a weight, controlled by a graduated arm or arms all substantially as and for the purpose herein set forth.

72,865.—OAR LOCK.—Michael A. Lanagan (assignor to himself and John Dailey), Brooklyn, N. Y.

I claim the combination of the hinged row lock, A, and pivoting bolt, C, with each other, substantially as herein shown and described, and for the purpose set forth.

72,866.—BOAT-DETACHING APPARATUS.—Michael A. Lanagan (assignor to himself, John Dailey, Robert Russell, and Andrew Mercein), Brooklyn, N. Y.

I claim the combination of the slotted lock and trip lever, E, with the hooked bars, B and C substantially as herein shown and described, and for the purpose set forth.

72,867.—MEANS FOR ATTACHING BRACKETS TO GLASS.—Leopold Jonas Lavater, Paris, France.

I claim the application of the gummed paper or cloth labels, f, for the purpose of securing brackets, A, to glass or other smooth or polished surfaces, B, substantially as herein shown and described.

72,868.—GLOBE VALVE.—Lewis Leigh, Bridgeport, Conn.

I claim the spring, g, with the socket, h, and clamp, i, applied around the valve stem between the stuffing box and hand wheel, as and for the purposes set forth.

72,869.—ILLUMINATED SIGN.—Chas. Lewando, Boston, Mass.

I claim an illuminated sign, made by combining with the perforated plate, D, a traversing parti-colored semi-transparent band, C C, through which the light for illumination passes, substantially as described and for the purpose set forth.

72,870.—ROLLER FOR TOWEL.—Wm. H. Lewis, N. Y. city.

I claim a movable end piece for securing the end of the towel roller, substantially as set forth.

72,871.—TABLE LEAVES SUPPORT.—N. Long, Eaton, Ind.

I claim the combination of the self-acting supports, C, with the springs, b b, and cords, d d, constructed, arranged, and operating as and for the purpose herein shown and described.

72,872.—MACHINE FOR MAKING CIDER.—Wm. Lucas, Rushville, Ill.

I claim, 1st, The metal plate, v, in the sockets, b, when arranged as described and for the purposes set forth.

2d, The combination of the crushing rollers, B C, pressing rollers, E F, guards, q, troughs, r r, spout, J, and strainer, I, when arranged to operate as shown and described.

72,873.—MODE OF SEPARATING BARK FROM WOOD.—Joseph Maitre, Chatillon, France.

I claim the process described in the present memorial, and consisting in the employment of heat in the shape of hot water, hot steam, hot air, or gases, either separately or in combination in conveniently arranged apparatus, for the purpose of decorticating or barking oak and other descriptions of wood, in the manner herein explained, and as illustrated by the annexed sheet of drawings, representing one of the modifications of the said apparatus.

72,874.—BENDING DEVICE.—Wesley Malick, Tidioute, Pa.

I claim, 1st, The arrangement of the elbow lever, B b, hung in the slots, a and a', and the frame, A, substantially in the manner and for the purpose specified.

2d, The combination of the stop, E, arranged in the slot, a, with the frame, A, and lever, B b, as herein described for the purpose specified.

3d, The horizontal lever, F, constructed as described, in combination with the elbow lever, B b, grooved projections, c c, and frame, A, substantially as herein described for the purpose specified.

72,875.—WHIP RACK.—J. A. Marshall, Mechanicsburg, Pa.

I claim the construction of a wire spring holder and spring guide, substantially in the manner and for the purpose as herein set forth.

72,876.—SHINGLE BAND.—C. B. Martin, Fond du Lac, Wis.

I claim the binder for shingles, constructed as described, consisting of the perforated wooden boards, A, and wires, B, operating as described for the purpose specified.

72,877.—METHOD OF PREPARING WOOD FOR MUSICAL INSTRUMENTS.—Wm. H. May, Bridgeport, Conn.

I claim, 1st, The improved mode of treating wood, to increase its vibratory power and sonorous quality, for application to the sounding boards and other parts of piano-fortes, and other musical instruments, or an equivalent process, substantially as herein described.

72,878.—MATERIAL FOR THE MANUFACTURE OF GLASS.—Peter E. Minor, Schenectady, N. Y.

I claim the manufacture of glass of the dross or refuse which is thrown off in the smelting of iron ore, substantially as described.

72,879.—HAND LOOM.—H. H. Mitchell, Mineral Point, Wis.

I claim the combination and arrangement of the lay, E, supporting the take-up beam C, with the link, e, loose ratchet pulley, H, shaft, a, screw-pins, L, and weights, g, all operating as described for the purpose specified.

72,880.—PLOW.—A. N. Moore, North Cohocton, N. Y.

I claim, 1st, The employment of the scrapers, b, and wings, d, either separately or together, in combination with a plow, substantially as and for the purpose shown and described.

2d, The slotted wing, d, substantially as shown and described, in combination with a plow, for the purposes set forth.

3d, The curved corners, a, of a plow, substantially as shown and described, in combination with the wings, d, for accomplishing the more perfect lateral delivery of the soil, all as set forth.

72,881.—MOTOR FOR CARRIAGES.—Duncan Morrison (assignor to himself and Wm. Hammond), Portland, Me.

I claim the arrangement of the levers, A B, pulleys, a b, cords, c c', trucks, e e' and f f', weights, g g', toothed belt, h, drum, i i', and the releasing device composed of the lever, n, cord, o, pulleys, p r, and spring catches, m, all as and for the purposes set forth.

72,882.—STEAM ENGINE GOVERNOR.—Daniel F. Mosman, Cambridge, Mass.

I claim, 1st, the combination of two shafts, A B, having independent rotation in the same direction, and a sleeve, G, adapted to receive longitudinal motion, by any inequality in the rotation of the said shafts, substantially as and for the purposes set forth.

2d, The combination with the shafts, A B, of the arm, F, and pin, f, the scroll cam, C, and sleeve, G, constructed and operating substantially as described.

3d, The combination of the sleeve, G, plungers, H H,' and pins, k k', and helical cam, L, constructed and operating substantially as described.

4th, The helical cam, L, in combination with a traversing rod, K, with an intervening device, such as the spring pins, k k', or their equivalents.

5th, The helical cam, L, in its combination with the pulley, M, the pawl and ratchet, m m', and the shaft, A.

6th, The cam, C, sleeve, G, ratchet wheels, g g', pawls, n n', and pins, f f2, on the arm, F, operating substantially as described.

72,883.—ROTARY BRICK MACHINE.—M. C. Motch (assignor to himself and W. F. Smirall), Covington, Ky.

I claim, 1st, The hopper, B, having the ribs, c, on its inner sides, in combination with the shafts, a and a', provided with the compressing arms, b, all constructed and arranged to operate substantially as and for the purpose described.

2d, The follower, C, actuated by the eccentric, E, in combination with the revolving drum, O, having the sliding molds, i, arranged thereon, substantially as set forth.

3d, The rotating mold drum, O, provided with a number of sliding mold boxes, i, constructed and arranged substantially as described.

4th, The repressing board, S, operated in the manner and for the purpose specified.

5th, The springs, U, in combination with the mold boxes, i, when the same are constructed and operate substantially as and for the purpose herein set forth.

6th, The guides, T and T', when constructed substantially as described and for the purpose specified.

7th, The shearing knife, Q, when operated in the manner substantially as shown and described and for the purpose set forth.

72,884.—PUMP PISTON.—Benj. H. Naves, Philadelphia, Pa.

I claim, 1st, The inside lining, C, constructed with a tapering base for receiving the clapper or valve box, and also with a provision at or near its upper end for receiving a packing, e, substantially as described.

2d, The pump bucket, A, constructed with two parts, a a', with packing, b, between said parts, being confined together, and the clapper held in place by means of the tangs on the ends of the bail, E, substantially as described.

72,885.—SCRIBE HOOK FOR WEATHER BOARDING.—John Nester, Portland, Oregon.

I claim the weather-board hook, M, having the shoulders, l l, when used in combination with the scale, O, slide gage, F, spur, G, and sliding marker, B, the whole being arranged in one instrument, and forming a combined tool of the character and for the purposes set forth.

72,886.—SMOKE EXTINGUISHER FOR BOILERS.—William H. Nobles, St. Paul, Minn.

I claim the arrangement of the flues, E F and G G, with the blower, B, perforated shaft, L, and discharge opening, M, whereby to carry off the smoke and sparks, and to dispense with a smoke stack, substantially as herein set forth.

72,887.—MACHINE FOR BORING HUBS.—D. J. Owen, Springville, Pa.

I claim the stationary screw shaft, A, bearing the slide, D, and adjustable cutters, f f', in combination with the yoke, F, bearing the hub, composed of two parts, when such yoke is adapted to revolve carrying the hub, the latter being fed to the stationary cutters by means of the screw, a x, and the double nut, l m, as herein described for the purpose specified.

72,888.—COUPLING FOR WHIFFLETREES.—Milton J. Palmer, Syracuse, N. Y.

I claim the sections, A and B, with their respective flanges, b b', ears, E E, arm, F, segments, c c, and projections, e e, when constructed and used in the manner and for the purposes specified.

72,889.—CULTIVATOR.—S. G. Peabody, Champaign, Ill.

I claim, 1st, The slide bolt E, applied to the draft pole, B, and arranged in relation with the cross bar, C, to operate in the manner substantially as and for the purpose set forth.

2d, The arrangement of the front bar, D, with the standards, F, of the caster wheels, G z, and the arms, g, of the cross bar, C, substantially as and for the purpose set forth.

3d, The cross bar, C, provided with the pendant arms, G, in combination with the plow beams, H H', and adjustable frames, I, all arranged substantially as and for the purpose specified.

4th, The stay or brace bars, j j, in connection with the bars, C D, and the standards, F, of the caster wheels, G, all arranged substantially in the manner as and for the purpose set forth.

5th, The bracing of the handles, J J, by means of the bars, K, substantially as set forth.

6th, The placing of the draw bolt, L, at the rear of the draft pole, substantially as and for the purpose specified.

72,890.—WINDMILL.—Walter Peck, Rockford, Ill.

I claim, 1st, The weighted link, S, lever, M, and link, M', as arranged, in combination with the adjustable collar, L, and links, L', arms and sails, K, K', for the purpose and in the manner as described.

2d, Windlass, U, rod, R, and yoke, R', in combination with the link, S, as and for the purpose set forth.

3d, In combination with the above described mill, the auxiliary mill or wings, P, as and for the purpose set forth.

72,891.—RAILWAY CAR.—Samuel Pennock, Kennett Square, Pa.

I claim, 1st, A momentum absorbing attachment to railroad cars, tenders or locomotives, which is made and operated substantially as herein shown and described.

2d, The movable platform, J, when provided with roughened, partly-projecting, partly-receding surfaces, substantially as herein shown and described.

3d, The movable platform, J, when connected by rods, I, or directly with a wedge or wedges, H, which work upon a follower, E, resting upon springs, F, in a box, B, arranged on a car, substantially as herein shown and described.

4th, The movable platform, J, when provided with a movable coupling bar, K, the same moving independent of the platform and within it, substantially as and for the purpose herein shown and described.

5th, The follower, E, when combined with the bolts, G, and springs, F, in the box, B, and with the wedge, H, and platform, I, substantially as herein shown and described.

6th, The connecting rods, I I, when set on edge, and when working in the slotted plate, b, in combination with the sliding platform, J, and wedge, H.

72,892.—HOSE COUPLING.—Duane T. Perkins and Charles F. Hovey, Springfield, Mass.

We claim, 1st, In a hose coupling composed of two parts, I I', interlocking by means of the inclined ears or lugs, B B, the nut, c, turning upon the stud, a, applied to either or both of said parts, substantially as and for the purpose set forth.

2d, The annular groove, x' water channel, x, and ports, m m, in combination with the elastic strip, w, the whole arranged substantially as described, and constituting a packing to be applied directly to the end of either or both parts of a hose coupling, and operating both by its own elasticity and by the pressure of the water, as set forth.

72,893.—CORPSE PRESERVER.—C. F. Pike, Providence, R. I.

I claim, 1st, The application of a tubular ice box to a corpse preserver, whether the same be made with openings near the bottom or on the bottom, or whether the same be made tight, and you get your cold by conduction, substantially as herein described, and delineated on the drawings hereunto annexed.

2d, Also the construction of the corpse preserver substantially in the manner set forth in the drawing and described in the specification, of getting the rotation or movement of the air in the chamber, A, substantially as described.

3d, Also the combination of the tubes or pipes, E, with the chamber, A, cases, I J, cover, C, substantially as herein described and for the purposes herein set forth,

72,894.—PRESERVING, REFRIGERATING, AND TRANSPORTING PERISHABLE ARTICLES.—Chas. F. Pike, Providence, R. I.

I claim, 1st, The application of the pipes or tubes to a vessel for the purposes of refrigeration, preservation, and transportation of meats, fruits, and provisions from one place to another, substantially as set forth and described whether the rooms are built to the ship, or built and put into the ship or vessel.

2d, Also, the combination of the tubes or pipes with the rooms, R, vessel, V, substantially as herein described and set forth, and for the purposes set forth.

72,895.—CONSTRUCTION OF RAILROAD CARS FOR PRESERVING AND TRANSPORTING MEATS, FISH, AND VEGETABLES.—Chas. F. Pike, Providence, R. I.

I claim, 1st, The application of tubular ice-boxes to a railroad car for the purposes of refrigeration, preservation, and transportation of meats, fish, and fruits from place to place, substantially as set forth and described.

2d, Also, the combination of the pipes or tubes with the room or rooms, R, with the running-gear, H, substantially as set forth, when used for the purposes set forth and described.

3d, Also, the tubular ice box, with or without its being perforated at the top and bottom, with the room, R, whether the same be constructed as a part of the car, or merely put upon a flat with the running-gear, H, attached to the flat, and to be removed at will or pleasure, substantially as and for the purposes set forth.

72,896.—DINING TABLE.—Manuel Pirz, East New York.

I claim the arrangement of the grooved base, B, and top, C, with the table A, when the tablecloth is adapted to be spread over the table and beneath the base, B, in such a manner as to permit the top, C, to revolve without its rollers coming in contact with the tablecloth, as herein shown and described.

72,897.—GATE.—C. H. Platt, North Fairfield, Ohio.

I claim forming the notches, F, in two sides of the rear gate post E, for the reception of the supporting bar, C, substantially as herein shown and described.

72,898.—TOBACCO CUTTER.—E. L. Pratt, Boston, Mass.

I claim the throat piece or gage plate, d, made, held in position, and having provision for removal without starting its fastenings, substantially as set forth.

Also, providing the swinging lever or carrier, e, with scale marks, substantially as shown and described.

72,899.—MACHINE FOR HEADING BOLTS.—F. B. Prindle, Southington, Conn.

I claim the combination of the holding dies, e and e', and squaring dies, g and h, with the upsetting punce, j' and plunger or heading die, k, when they are constructed, arranged, and operated substantially as herein described and set forth.

72,900.—LANTERN.—E. T. Prindle and John Wellfare, Aurora, Ill.

We claim the arrangement of the case, A, the bull's eye, B, glass, C, and lamp, K, the case being provided with a lining, I, and with perforations, l, whereby a steady current of air is supplied to and in the direction of the lamp flame, substantially as and for the purpose specified.

72,901.—WAGON JACK.—R. B. Prindle, Norwich, N. Y.

I claim the notched rack bar, E, arranged and constructed in combination with the connecting link, f, fulcrum lever, D, bottom bar, a, and sliding frame C C, operating substantially in the manner as herein described for the purposes set forth.

72,902.—RAILROAD RAIL.—E. D. Pritchard, Boston, Mass.

I claim a railroad rail, formed with enlarged ends, as described, and mitred joints, when the small end of the joint is provided with shoulders, c, and connected together by means of bolts passing through elongated openings in the same, substantially as and for the purpose set forth.

72,903.—GUN WAD PUNCHER.—Ransom Rathbone, New York city.

I claim a wad punch, provided at or near its delivery end with lubricating ways or perforations, for operating in combination with an outside supply-chamber or box, from which the oil or grease is drawn or fed to the interior of the punch for greasing the edges of the wads as or before they are delivered from the punch, substantially as specified.

72,904.—DEVICE FOR SOLDERING SHEET METAL CANS.—Philip Rees, Bridgewater, Pa.

I claim the rod, B, the cylinder, C, radiating arms, f f, etc., hinged vertical plates, F F, etc., the compresser, D, the pin, d, the mortises, c c, the latch, A, and mortise, b, the disk, E, or their equivalents, constructed, arranged, and operated in the manner and for the purpose shown and described.

72,905.—ATTACHING ORNAMENTAL HEADS TO NAILS, SCREWS, etc.—Thos. C. Richards, New York city.

I claim attaching ornamental heads to nails and screws by means of a recess or grooves to receive the head of the nail and screw, composed of a separate piece of metal attached to the under side of the ornamented head, as herein shown and described.

72,906.—MITRE BOX.—John W. Richardson, Boston, Mass.

I claim a mitre box constructed by combining with the piece sustaining the saw guideposts, stock guides separately pivoted, so as to be turned each on its own center with respect to said piece, and arranged to be held thereto, and adjusted by means of pivoted links, all substantially as set forth.

72,907.—COTTON-SEED PLANTER.—O. Richardson, Boston, Mass.

I claim, 1st, The combination and arrangement of the projection, I, and the two rotary agitators, K K, with the hopper and the seed-dropping wheel arranged therein as specified.

2d, Also, the arrangement and combination of the disks, g g, with the two agitators, K K, a series of blades, and their hopper.

3d, Also, the application of the plowshare and cover supporter or frame, L, to the carriage body, by means substantially as specified, whereby the adjustment of the plowshare may be effected, and the coverer be free to play vertically, in manner as explained.

4th, Also, the formation of each of the notches or cavities, d, of the seed-dropping wheel, E, hook-shaped, as represented, and to operate with the advance spout, and upon the seed, as specified.

5th, Also, the combination and arrangement of the deflector, T, with the hopper and seed-dropping wheel, the agitators, and the projection, I, arranged in such hopper, as specified.

72,908.—CLOTHESLINE HOLDER.—Peter Riordan, Washington, D. C.

I claim the device above described, consisting of the frame, A, clamp, C, and spool, B, when combined, constructed, and operating substantially in the manner as and for the purpose specified.

72,909.—SINK TRAP.—Jas. S. Rogers, Worcester, Mass.

I claim a trap for an iron kitchen sink, constructed with lugs, E F, or their equivalents, to secure the strainer or cover in position, so that the same may be removed without disturbing the waste-pipe coupling, substantially as described.

72,910.—HARVESTER REEL.—Wm. F. Rundell, Genoa, N. Y.

I claim the metallic elbows, E, constructed as described, in combination with the plates, B and D, constructed as described, as and for the purpose specified.

72,911.—TUMBLER WASHER.—E. W. Russell, Baltimore, Md.

I claim the tumbler washer, above described, consisting of the water pipe, B, cap, C, valve, D, and rod, E, all constructed, combined, and arranged substantially as and for the purpose specified.

72,912.—CIGAR PIPE.—E. Schlichting, New York city.

I claim the attachment, D, having the chamber, H, when attached to the part, C, having the chamber, a1, as herein shown and described.

72,913.—CONSTRUCTION OF DIKES, LEVEES, AND EMBANKMENTS.—J. C. Schooley, New York city.

I claim, 1st, The construction of an impervious and continuous core for dikes or levees, formed by pouring into a prepared channel any suitable medium or mixture, in a heated or liquid state, that will become hardened when cooled, substantially as and for the purpose specified.

2d, Also, the construction and arrangement of the portable metal, earthen or wooden mold, when adapted to receive and deposit the core in its liquid state, in the prepared channel, and above it, in the manner and for the purpose specified.

72,914.—LOCK FOR TRAVELING BAG.—Carl H. Schubeus, Newark, N. J.

I claim the plate, O, knob, G, spring, H, bolt, K, and catch, E, substantially as herein described and for the purposes named.

72,915.—MECHANICAL MOVEMENT.—James M. Scott, Kinsman, Ohio.

I claim the feed shaft, E, slotted crank, D, and pin, c, in combination with the pitman, B, and shaft, A, arranged and operating in manner and for the purposes substantially as described.

72,916.—GUNPOWDER CANISTER.—Olin Scott, Bennington, Vt.

I claim as a new article of manufacture, a metallic gunpowder keg or canister, of hexagonal or polygonal form, with the sides and heads corrugated, the heads being secured by seaming, and one of the heads having an opening in it, near an angle, all constructed and arranged as and for the purpose herein shown and described.

72,917.—HEDDLE FOR LOOM.—J. Senneff, Philadelphia, Pa.

I claim, 1st, The heddles of looms, when constructed with the metallic clasps, C, or metallic eyes, B, and also with metallic eyelets, D, cast upon twine or wire, substantially as set forth.

2d, So constructing the removable eyelets, for attaching the heddles to the rods, that they may be clamped upon the same independently for the purpose of replacing a broken heddle, substantially in the manner set forth.

72,918.—BEEHIVE.—David Shaeffer and Aaron McCabe Shaeffer, Centreville, Iowa.

We claim the arrangement of the entrance, A, drawer, D, chamber, C, and removable boxes, G G1 G2, in connection with the inclosing box, E, and frame, A, substantially as described.

72,919.—ART OF MANUFACTURING AND UNITING ALLOYS OF METALS IN FORMING WATER PIPES AND OTHER ARTICLES.—William Anthony Shaw, New York city.

I claim, 1st, Covering the surface, either inside or out, or both inside and out, of an alloy of lead and antimony, or of lead and tin, or of lead, tin, and antimony, or their equivalents, for this purpose, with pure tin, when said alloy is made in a pipe or other article of manufacture, substantially as described.

2d, Covering the surface, either inside or out, or both inside and out, of an alloy of lead and antmony, or of lead and tin, or of lead, tin, and antimony, or their equivalent, for this purpose, when made into a pipe or other article of manufacture, with an alloy of cadmium and tin, or of cadmium, tin, and bismuth, or of tin, lead, cadmium, and bismuth, or of tin and nickel, or of tin, nickel, and bismuth, or their equivalents, for this purpose, substantially as described.

3d, Covering an alloy of lead with an alloy of tin, when made in a pipe or other article of manufacture, by first making the lead alloyed pipe or article, and then applying the tin alloy thereto in a state of fluidity.

72,920.—APPARATUS FOR COOLING MILK.—C. L. Sheldon, Lowville, N. Y.

I claim, 1st, The combination of the water receiver, a d, with the connecting arms, and the valve, r, attached to the plunger, E, as and for the purpose specified.

2d, The combination of the ratchet wheels, f f, the windlass, s, the spool, e, the tipping shelf, t, and weight, p, as constructed and arranged for the purpose of stopping the agitation at any given time.

72,921.—VISE.—Peter Shellenbock (assignor to himself and Milton Ralston), Middletown, Ohio.

I claim, 1st, The right and left screw, C, in combination with frame, A, and jaws, B, constructed, arranged, and operating in the manner and for the purpose substantially as described.

2d, The lever, E, with its slot, M, and detent, F, in combination with scalloped wheel, D, and screw, C, for operating the jaws, B, in the manner and for the purpose described.

72,922.—PLOW, POTATO PLANTER AND SEEDER COMBINED.—Solomon Shetter, New Cumberland, West. Va.

I claim the endless carrying or distributing belt, H, provided with buckets, K, or forked projections, I, in combination with the hopper, D, tube or chamber, E, plow, A, and covering share, Jx, all arranged substantially as and for the purpose set forth.

72,923.—PRUNING SHEARS.—Joseph Sill (assignor to Drake, Sill, and Hutson) Montoursville, Pa.

I claim, 1st, The inclined socket, B', substantially as and for the purpose specified.

2d, The instrument above described, having the socket, B', and the curved and beveled blade, C, operating in combination with it, substantially as and for the purpose set forth.

72,924.—APPARATUS FOR DELIVERING GOODS.—James D. Sinclair, Brooklyn, N. Y.

I claim, 1st, The traps, D D, when pivoted at the angles of the zigzag way A, substantially as herein shown and described, for the purpose of arresting goods to be lowered, to prevent their descending with too great velocity.

2d, Providing the traps, D D, with adjustable backs, b b, substantially as described, and for the purpose of adjusting the device for goods of greater or less bulk, as set forth.

3d, The traps, D D, when arranged as described, in combination with the spring boards, d e, all made and operating substantially as and for the purpose herein shown and described.

72,925.—LAMP BURNER.—George Smith, Providence, R. I.

I claim, 1st, The construction of the wide and narrow openings, a a', through the burner case, with a lip, b, formed on the case, and arranged in such a position as to receive the flaring forked end, c, of the spring slide, G, substantially as and for the purposes described.

2d, The construction of the spring slide, G, with a forked end, c, and a narrow tail piece, I, this slide being curved and perforated substantially as described.

3d, The manner of attaching the spring, J, to the wick tube, by a staple, g, substantially as and for the purposes described.

72,926.—PENCIL HOLDER.—Jonathan Smith, Tiffin, Ohio.

I claim the elongated tube, A, with an opening in its side, around which opening and tube is an India-rubber band, G, said tube being provided with teeth, e e, for securing it within the garment, for holding a pen or pencil, as set forth.

72,927.—BOILER TUBE CUTTER.—W. Bell Smith, Charleston, S. C.

I claim, 1st, The hollow mandrel, D, cap plate, I, cutter bar, G, with the inclined extremity, b, and the feed screw, L, in combination with the cutter block, H, all constructed and operating substantially as and for the purpose described.

2d, The clamp, E, in combination with the box, C, for securing the machine to a boiler flue sheet, in the manner described.

3d, The gear wheels, M M', N N', the nut, P, the mandrel, D, and the cutter bar, G, combined, arranged, and operating as and for the purpose described.

4th, The pin, K, held by the spring, e, and working in the annular groove, d, in combination with the mandrel, D, and box, C, as herein shown and described, for the purpose specified.

5th, The combination of the clamp, E, the box, C, the mandrel, D, the cutter bar, G, the cutter block, H, the nut, P, and the gears, M M', N N', constructed, arranged, and operating substantially as and for the purpose described.

72,928.—SNOW SWEEPER FOR STREETS.—William W. Smith, Chicago, Ill.

I claim, 1st, The range of brushes, E, mounted on shafts, D, with universal joints, C, in combination with the yokes, F, all arranged and employed as and for the purposes specified.

2d, The construction of the brushes, E, by setting their wires in holes in the brush heads, and securing them with caps, S, applied as represented and described.

3d, The lever, M, chain, K, eccentric, I, and rod, H, in combination as and for the purposes specified.

4th, The wheel, I, in combination with wheels 2 and 3, and clutch, O, for the purpose of transmitting the power from one to the other series of brushes, as set forth.

72,929.—BUTTON.—D. M. Somers, Brooklyn, N. Y., and Walter S. Atwood, Newark, N. J.

We claim providing buttons with a hollow neck, N, to be compressed to fit the diminished form of conical stem, S, as shown in figs. 2 and 3, at A, substantially as herein specified and described for the purpose set forth.

72,930.—INDICATOR FOR RAILWAY STATIONS.—Elihu Spencer, Ottawa, Canada.

I claim a case, A, having the cylinder, E, mounted therein, with the disk, d, and spring, l, arranged to hold it in position, and having the series of plates with the names of stations thereon, hinged together and arranged to wind over said cylinder to and fro, and fold up in the lower part of the case, substantially as shown and described.

72,931.—FURNACES FOR ROASTING AND TREATING ORE.—Charles Stetefeldt, Austin, Nevada.

I claim a furnace constructed with a shaft, B, the fall of the ore through which is retarded by the upward motion of the heated air and chloridizing gases, combined with a fireplace, J, opening into the canal, H', and below the flue, D, substantially as described and for the purpose set forth.

72,932.—MANUFACTURE OF OIL CLOTH.—John B. Stevenson, Jr., Philadelphia, Pa.

I claim the mode of manufacturing oil cloth by the means substantially as described.

72,933.—CAR COUPLING.—John T. Stoakes, Parish of New Church, England.

I claim, 1st, The construction and arrangement of the slotted pivoted bar, D, elliptic springs, C, and bumper bar, b1, substantially as described, for the purpose specified.

2d, The shoulder, b3, of the bumper head, with a link socket to receive the link of an ordinary car coupling, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the two collars, H and I, with the vertical shaft, G, the said collar and shaft being constructed and arranged substantially as herein shown and described, so that the cars may be uncoupled and the brake applied by operating the same shaft.

72,934.—MARKING GAGE FOR SEWING MACHINES.—Wm. M. Stoddard, San Francisco, Cal.

I claim the device for marking for tucks, arranged in relation to the sewing machine substantially as described, and consisting of the adjustable guide bar, A, marker, G, having a slot, l', spring, a, and adjustable spring bar, J.

72,935.—FEED BUCKET.—R. C. Sturges, Barnstable, Mass.

I claim a feed bucket having an outer or grain containing chamber, and an inner or feed chamber connected together and supplied, the latter from the former, substantially as set forth.

72,936.—STRAW CUTTER.—Bernhard Suverkrup, Louisville, Ky.

I claim the combination of the crank, S, fly wheel, A, with adjustable knife, B, bevel wheels, E, F, G and H, slot, O, wrist, P, levers, K and L, ratchet, M, and spring catch, N, when constructed, arranged and operating in the manner and for the purposes set forth.

72,937.—COOKING STOVE.—Wm. B. Treadwell, Albany, N. Y.

I claim, 1st, The grated way, B, substantially in the manner and for the purpose herein set forth and described.

2d, Also the inclined plate, D, attached to the grated way, substantially as described and for the purpose herein set forth.

3d, Also the grate, C, the grated way, B, and inclined plate, D, in combination substantially as and for the purpose described.

4th, Also the grated way, B, the grate, C, the inclined plate, D, in combination with the coal box, E, the ash pan, F, constructed substantially as and for the purpose herein described.

72,938.—COOKING STOVE.—Wm. B. Treadwell, Albany, N. Y.

I claim, 1st, Grate, G, combined with plates, F and v, constructed substantially in the manner and for the purpose above described.

2d, Also grate, G, plates, F and v, in combination with plates d and e, for introducing air at m and n, constructed substantially in the manner and for the purposes above described.

3d, Also the fire chamber, constructed as above, in combination with the sifter, L, substantially in the manner and for the purposes above described.

4th, Also the sifter, L, in combination with the boxes, M and N, and the grate, G, substantially in the manner and for the purpose above described.

5th, Also the hearth, H, constructed substantially in the manner and for the purpose herein described.

72,939.—MARINE STEAM ENGINE GOVERNOR.—Edward M. Troth (assignor to himself and John A. Secor), New York city.

I claim the combination of the pendulum, I, with the slide valve, H, steam chest, L, steam cylinder, A, and piston, B, and with the piston rod, C, and connecting rod, D, all made and operating substantially as and for the purpose herein shown and described.

72,940.—FIELD THRESHING MACHINE.—A. W. Tucker, Waxahatchie, Texas.

I claim, 1st, Arranging a threshing cylinder above an endless apron, E, of a field threshing machine, in such a manner that the straw and grain emerging from the threshing cylinder, will fall upon the same apron by which they were conveyed to the said cylinder, substantially as herein shown and described.

2d, The apron, E, threshing cylinder, J, and roller, M, in combination with each other, all arranged and operating substantially as and for the purpose herein shown and described.

3d, The spirally flanged serrated take up roller, L, when made and operating substantially as and for the purpose herein shown and described.

4th, The hinged bars, c, in combination with the roller, D, apron, E, guards, N, and lever, H, all made and operating substantially as herein shown and described.

72,941.—CAR SPRING.—Richard Vose, New York city.

I claim the within-described improvement on the combination spring patented by me December 17, 1865, viz: placing a plain cylinder of sulphurized India-rubber or gutta-percha within the coiled metallic portion of the spring and then grooving said cylinder and more perfectly combining it with the said metallic portion of the spring preparatory to subjecting it to the requisite curing process, all substantially as herein set forth.

72,942.—ROLLER JOURNAL BOX.—Edward Wadhams, Yorkville, N. Y.

I claim the anti-friction rollers, E, for supporting the axle in its journal box, or *sine qua non*, when said rollers are supported by pivots, C, in radial grooves or channels, b, in the side plates, B, substantially as shown and described.

72,943.—SPRING BED BOTTOM.—Alfred Walker, New Haven, Conn.

I claim providing the slat, E, with a socket corresponding to each spring whether the socket be attached to or formed in the said slat the two sockets opening in opposite directions and so as to receive and hold the two springs in the manner and for the purpose as herein set forth.

72,944.—TRAVELING BAG.—Zachariah Walsh, Newark, N. J.

I claim, 1st, The inner edge of the carpet-bag frame bent outward in such manner as to prevent contact with the cloth, B, whereby the chafing and wear of the latter are prevented, as herein shown and described.

2d, The frame of traveling bags secured to the cloth or leather by means of the eyelets, C, either with or without the closed end, c, as herein shown and described.

72,945.—STEERING APPARATUS.—Jacob H. Weaver, Mauricetown, N. J., assignor to himself and George Webb, Philadelphia, Pa.

I claim, 1st, The rudder post, a, with its toothed segment or pinion, k, and the toothed segment, h, in combination with the hand wheel shaft, c, its pinion, d, and the shaft, D, wheel, e, and pin, l, or their equivalents, the whole being constructed and operating substantially as described.

2d, The segment or pinion, K, secured to the rudder post when of greater thickness than the wheel or segment with which it gears, for the purpose specified.

72,946.—REVERSIBLE LATCH.—R. L. Webb, New Britain, Conn.

I claim the combination of the lock and latch when the latch bolt and its operative mechanism are arranged in a case or frame independent of the main case and constructed so that the latch bolt may be removed substantially as described without removing the said independent case from the main case.

72,947.—HORSE COLLAR.—Leopold Wegmenn and C. F. Diessel, Allegheny City, Pa.

We claim, 1st, The collar to be used without hames and dispensing with the rim having the curved pieces of wood, B B, and the blades, C C, forming a part of it, constructed substantially as and in the manner set forth.

2d, The metal blade, C, having the notches, f f f, and the clasp, m, for the purpose set forth.

3d, The clip, consisting of the detachable link, a, plate, b, T-shaped portion e, constructed and operating substantially as set forth; and

4th, The combination of the clip, G, with the metal blade, C, as shown in the drawing, Fig. 3.

72,948.—COMBINED SASH AND SHUTTER FASTENER.—A. H. Wemple and Thomas D. Richardson, New York city.

I claim the jointed plate, A, having a bent extremity, c, and combined with the duplex hook, B, to form a blind and sash fastener, as herein described and represented.

72,949.—METHOD OF MANUFACTURING RIBS AND BOLSTERS FOR DOUBLE-BARRELLED GUNS.—D. W. Wesson and John H. Blaze, (assignors to Wesson Fire-Arms Company), Springfield, Mass.

We claim, 1st, Constructing "ribs" for double-barrelled guns from a metallic tube, substantially as set forth.

2d, Constructing a "bolster" or keel to be used in combination with a rib upon a double-barrelled gun from a collar fastened to or made a part of the metallic tube out of which such rib is to be formed, substantially as described.

3d, As an article of manufacture a rib for use upon a double-barrelled gun when formed from a metallic tube, substantially in the manner specified.

72,950.—BRIDLE BIT.—Richard P. Whelan, Leavenworth, Kansas.

I claim, 1st, The straight bar, A, having rings or bows, a a, the curved under bar or bow, B, with one or more rollers, b, as constructed with ornamental scroll side pieces, C C, diamond-shaped rings, E E, friction rollers, e e, when combined with single reins, G G, arranged and operating substantially in the manner herein described for the purposes specified.

2d, Also the combination of the single pair of reins, G G, with the loops, h h, pulleys, I I, rings, E E, rollers, F F, and snaffle hook, g, when connected and arranged in the manner as and for the purposes herein set forth.

72,951.—MACHINE FOR GRINDING AND POLISHING ARTICLES OF METAL.—J. Albert Whelpley, Greenwich, New Brunswick.

I claim the combination of the two grindstones or polishing wheels, G G, rest, J, rock shaft, O, and arm, P, arranged and constructed as and for the purposes described.

72,952.—STEAM ENGINE LUBRICATOR.—J. L. Whipple and Adolphus Bonzano, Detroit, Mich.

We claim the combination of the perforated or indented rod, E, and oil cup, D, with the cylinder, A, and slide valve, B, substantially as described for the purpose specified.

72,953.—DITCHING MACHINE.—David Whisler, Union Township, Ohio.

I claim, 1st, The hinged platform, T, for regulating the depth of the furrow or ditch, substantially as described.

2d, In combination with the above, screw, h, and springs, t, substantially as set forth.

3d, Axle, B, wheels, C C, beam, A, platform, T, screw, h, springs, t, and vertical knife, P, all combined and arranged as and for the purpose set forth and described.

72,954.—BOLT CUTTER.—W. W. Worden (assignor to himself and Daniel Howell), Waukesha, Wis.

I claim eccentric lever, B, hook, E, roller, D, and cutting-knife, C, in combination, substantially as described.

72,955.—LACING DEVICE.—Alfred Young, Philadelphia, Pa.

I claim, 1st, The cleats, d d, attached to a shoe, or other article of wearing apparel secured by laces, at opposite sides of an opening or slit in the same, and arranged, in respect to the usual eyeleted openings, as set forth.

2d, The cleat, d, made in the form of a double hook, as and for the purpose specified.

72,956.—CASTER FOR TRUNKS.—W. H. Young and L. Young, Boston, Mass.

We claim the combination and arrangement of the several parts of the caster, namely, the bolt, c, with its wheel, f, the slot, d, the pin, e, and the spring, g, all in combination, and operating substantially in the manner and for the purpose above set forth.

72,957.—GATE.—Isaac N. Young, Swan, Ind.

I claim, 1st, In combination with a sliding gate, the arrangement of the pulley shaft, e', and crank shaft, H, the latter two connected together by the rings at their extremities, in the manner and for the purposes set forth.

2d, The sliding bars or arms, a a, in combination with the crank shaft, H, when used in connection with a farm gate, substantially as and for the purpose specified.

3d, The spring, O, when used in connection with the cord, c, upon a farm gate, substantially as and for the purpose specified.

72,958.—WATER METER.—Cyrus W. Baldwin, Boston, Mass.

I claim, 1st, The combination, in a meter such as described with the valve rods and valves for regulating the flow of the liquid through the meter, of the flexible diaphragm, and spring devices, or their equivalents, for operating the said valves, under such an arrangement that, while the valves and valve rods are partially actuated by the said diaphragm, they shall be caused to complete their movement in either direction by the action of the said spring devices, substantially in the manner set forth.

2d, The combination, with the flexible diaphragm, slotted forks, o o', and sleeves, r r', which carry the triangular wipers, of the valves, c1 c2, valve rods, s s', and spring devices for completing the movement of the said valves, in the manner and for the purposes shown and specified.

3d, The combination, with the flexible diaphragm, valves for closing the outlet ports, and mechanism for actuating said valves, of the vibratory arms, z z, and valve, n, for closing the outlet port, substantially as shown and for the purposes described.

4th, The combination and arrangement, with the valves, c1 c2 and n, and mechanism for actuating the same, of the ports for the admission and discharge of the liquid into and from the meter, substantially as herein shown and set forth.

REISSUES.

69,746, dated October 15, 1867; antedated September 17, 1867; reissue 2,821.—WINDOW-SASH FASTENER.—Hobart G. Arnold, Rochester, N. Y.

I claim a sash lock, composed of bolt, H, tumbler, G, and notched plate, the whole combined and arranged substantially as and for the purposes set forth.

69,755, dated October 15, 1867; reissue 2,822.—COMB.—Jas. H. Briggs, Brooklyn, N. Y.

I claim the longitudinal flanges, b, on the metallic part, B, constructed as described, and fitting over longitudinal shoulders, a, in the part or parts, A, as herein set forth for the purpose specified.

69,181, dated September 24, 1867; reissue 2,823.—BUCKLE.—Ezra Cole, Fairfield, Mich.

I claim the buckle, constructed as described, consisting of the curved frame, A, having at one end the plate, C, provided with a downward projection or lug, D, in combination with the bail, E, whose pins, F, rest and slide upon the upper edges of the curved frame, A, as herein described, as and for the purpose specified.

52,945, dated February 27, 1866; reissue 2,824.—STEAM GENERATOR.—Charles F. Jauriet, Aurora, Ill., assignor to himself and A. J. Ambler.

I claim, 1st, A water bridge placed within the fire box, constructed in the form of a semi-tube, as set forth, flanged and riveted to the flue-sheet and side water legs, so as to afford an unobstructed communication with the back-water space and side water legs, said sheet being sustained by stay-bolts, substantially as set forth.

2d, The combination of the vertical stay-bolts, C C, and the through stay-bolts, I' I', with the semi-tube water bridge and the outer jacket of the fire box, substantially as shown and for the purpose set forth.

52,945, dated February 27, 1866; reissue 2,825.—STEAM GENERATOR.—C. F. Jauriet, Aurora, Ill., assignor to himself and A. J. Ambler.

I claim a coal-burning locomotive, constructed with the following elements, viz: a water bridge constructed and applied substantially as shown, and with a series of air-jets, I I, through the several sides of the fire box, located and limited in their location around the fire box above the fire, and below the water bridge, substantially as shown.

66,035, dated June 25, 1867; reissue 2,826.—BOOT CRIMPER.—De Witt C. Mowrey, Milford, Mass.

I claim the combination, with the clasp and spreader, and the screw for operating the latter, of auxiliary or movable jaws, placed on each side of the spreader, and supported upon and depending from the said clasp, so as to be located and held at all times between the jaws of the same, in the manner described, so that when the spreader is lowered, the movable jaws shall approach each other and recede from the jaws of the clasps, as herein specified.

Also, the application of the auxiliary jaws to the clasp, by means substantially as described, viz: by the arms provided with ears, and by the slot having the supports arranged as set forth.

74,028, dated April 23, 1867; reissue 2,827.—APPARATUS FOR COOLING MILK.—Watson Peck, Babcock's Grove, Ill.

I claim the combination of a pipe, B, provided with a receiver, C, or its equivalent, with a cooling vat, A, arranged to operate substantially in the manner and for the purposes herein set forth.

61,956, dated Feb. 12, 1867; reissue 2,828.—COOKING STOVE.—J. J. Savage, Troy, N. Y.

I claim, 1st, The location of a fuel doorway or feed mouth, B, of stove furnace, substantially below and forward of the combustion or flame chamber, C, thereof in such immediate or contiguous position to the fire box, A Y, thereof, as to admit of fresh fuel being fed thereinto, in manner substantially as hereinbefore described for the purposes set forth.

2d, Also the extension of the fire box, A, forward of the combustion or flame chamber, C, of stove furnaces, and immediately under or contiguous to the aforesaid located fuel doorway, B, thereof, in manner substantially as herein described, for the purposes set forth.

3d, Also a level feeder, F, substantially as described, when operated in combination with and through said located fuel doorway, B, of stove furnaces, in manner substantially and for the purposes herein set forth.

4th, Also providing a feed lever, F, with a fulcrum hook, c, or an equivalent therefor, when used in combination with a fulcrum ridge or bearing, d, arranged on the edge of the aforesaid located fuel doorway, B, of stove furnaces, substantially as and for the purposes set forth.

5th, Also in combination with the front plate, D, of stove furnaces, a fire or guard plate, E, when arranged in position above the aforesaid located fuel doorway, B, of the fire box thereof, and about opposite the combustion or flame chamber, C, substantially as and for the purposes set forth.

6th, Also the arrangement of the front plate, D, of stove furnaces, in an inclined or slanting position, in combination with the aforesaid located fuel doorway, B, such as to overhang the combustion or flame chamber, C, and fire box thereof, substantially as and for the purposes set forth.

7th, Also the combination of the aforesaid located fuel doorway, B, fire box, A Y, the combustion or flame chamber, C, and the lever feeder, F, as applied to stoves, to operate in manner substantially as and for the purposes herein described.

8th, Also the peculiar manner or method of feeding or introducing fresh fuel directly into the fire box of stove furnaces, by forming for its reception clear vacant room or places in, below and between ignited fuel or live coke therein, by the conjoint means substantially of a feed aperture or doorway, B, located as described, and of a feed lever, F, or equivalents therefor operating substantially as herein set forth for the aforesaid purposes.

21,029, dated July 27, 1858, reissue 2,829.—CLOTHES WRINGER.—Ann Jane Sergeant, Dayton, Ohio, administratrix of the estate of Isaac A. Sergeant, deceased, assignor to Sylvanus Walker, Newark, N. J.

I claim, 1st, The employment or use of a portable frame or yoke, B, with uprights, S S', or their equivalents, for supporting a clothes wringing mechanism in position on one side of a common wash tub, for the purposes set forth.

2d, The application of an adjustable clamping device, when employed to attach a clothes wringer to one side of a wash tub, substantially in the manner described and for the purposes set forth.

DESIGNS.

2,851.—SADIRON HANDLE.—Arad Barrows, Philadelphia, Pa.

2,852.—MOLDING FOR PICTURE FRAMES.—John H. Brown, Geneseo, N. Y.

2,853.—MOLDING FOR SHOW CASES.—Caspar Fersch, New York city, assignor to Hoffman & Fersch.

2,854.—TRADE MARK.—John Gorham Providence, R. I.

2,855.—PISTOL BARREL.—John Murphy, New York city.

2,856.—KEY TAG.—Arthur Stafford, Brooklyn, N. Y.

2,857.—REFLECTOR.—August Wilhelm, Philadelphia, Pa.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

69,062.—BOOK COVER PROTECTORS.—Charles L. Alexander and Victoria A. Osborn, Washington, D. C. Dated September 24th, 1867. Application for reissue received and filed December 19th, 1867.

1st. We claim the elastic or inelastic bands or straps, b b b b, connecting the folds, D D D D, by means of clasps or other devices, and applicable to any form of book cover, in such manner as to render it extensible.

2d, The elastic bands or straps, a a a a, to form an expansible connection for the two halves of the book cover protector, substantially as described.

3d, Such a book cover protector, or mode of covering books, as by reason of its expansibility and extensibility, may be adjusted to books of various sizes, substantially as described.

15,514.—FRUIT BOX.—Jabez W. Hayes, Newark, N. J.—Dated Aug. 12th, 1856. Application for reissue received and filed Dec. 20th, 1867.

I claim, 1st, A box or basket formed of veneers or lamina of wood, laid across each other and turned up to form the sides, substantially as specified, so that the bottom is made of two thicknesses secured together, and the sides of single thicknesses.

2d, Connecting the veneers, A and B, together at the bottom of the basket or box, substantially in the manner specified.

3d, A box or basket formed of veneers or lamina of wood, crossing each other at the bottom and turned up to form the sides, in combination with a cord or its equivalent, passing around the sides to hold them together, substantially as set forth.

4th, A box or basket in which one lamina of wood forms two of the sides and one thickness of the double bottom, substantially as set forth.

13,096.—SECURING CUTTERS TO ROTARY DISKS.—Nathan Stephens (assignee of Jonah Newton), New York city. Dated June 19th, 1855. Application for reissue received and filed Dec. 21st, 1867.

I claim, 1st, The employment and use of cutters for rotary disks, plates, or saws, composed of the segment of a ring fitted in recesses comprising a portion of a circle, and arranged as shown, or in any equivalent way, to admit of the adjustment of said cutters to compensate for wear, and also to admit of the ready detachment of the same for the insertion of new teeth when required.

2d, A rotary cutter, consisting of a disk having recesses, which represent the segment of a circle, and teeth adapted to and admitting of being adjusted in these recesses, substantially as set forth for the purpose specified.

3d, The tooth or cutter consisting of the segment of a ring having on its convex side a rib adapted to a groove in the above mentioned recess,

4th, The screw, b, and segmental nut, f, arranged for screwing the tooth or cutter to the disk or plate, as set forth.

65,917.—COVERING WHIPS.—Charles C. Pratt (assignee of Gamaliel King), Westfield, Mass. Dated June 18th, 1867. Application for reissue received and filed Dec. 21st, 1867. Div. 1.

I claim, 1st, A waterproof coating, consisting of the combined ingredients herein shown and described.

2d, The application of the dissolved caoutchouc, with or without the lead and oil, to a whip, substantially as and for the purpose shown.

65,917.—COVERING WHIPS.—Charles C. Pratt (assignee of Gamaliel King), Westfield, Mass. Dated June 18th, 1867. Application for reissue received and filed Dec. 21st, 1867. Div. 2.

I claim, 1st, The covering of the body of a whip with an inner braiding, d, substantially as shown and described.

2d, The combination of the inner and outer braidings, d f, with the varnish or coatings, c e, all applied in the construction of a whip, substantially as shown and described.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio. Dated Oct. 15th, 1861. Application for reissue received and filed Dec. 23, 1867. Div. A.

I claim, 1st, The combination, substantially as described, of a brace bar, F, pivoted to the inner rear corner of the main frame, and extending forward outside of and parallel to the inner driving wheel, with a coupling arm, F', pivoted to the main frame near its front outer corner, the brace bar and coupling arm being firmly united at the point of intersection for the purposes set forth.

2d, The combination, substantially as described, of the longitudinal brace bar with the transverse coupling arm, when the two are rigidly connected at their point of intersection, and vibrate on an axis diagonal to both (or passing through their respective pivots), whereby the coupling frame can play freely without cramping the joints, as set forth.

3d, The combination, substantially as described, of a shoe (to which the finger beam is attached), a coupling arm, pivoted at one end to the toe of the shoe and at the other to the main frame, and a brace bar rigidly secured to the coupling arm at one end and pivoted to the main frame at the other, with an intermediate coupling connecting the heel of the shoe with the coupling arm, for the purposes set forth.

4th, The combination, substantially as described, of a shoe extending behind the finger beam with a swiveling link converting the shoe and coupling arm, for the purpose of allowing the finger beam to fold horizontally.

5th, The combination, substantially as described, of a coupling brace and overhanging arm, F2, a shoe and swiveling link, h2, whereby the finger beam is allowed to swing both vertically and horizontally.

6th, The combination, substantially as described, with the right angled coupling frame, F F', of the lifting lever flexibly connected with the rigid angle of the frame, for the purposes set forth.

7th, The combination in a harvester of two wheels, an inside main frame, a rigid tongue, a brace bar, rigidly secured to a coupling arm, pivoted at one end to the main frame and at the other end to the shoe which carries the finger beam, a swiveling coupling between the brace bar and shoe, and a caster wheel to support the divider end of the finger beam.

8th, The combination, with a horizontally folding finger beam, of a caster wheel which, when the beam is folded, swings into a position where its face is parallel with the finger beam, and with the path of the machine, and sustains the finger beam in its folded position.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio.—Dated Oct. 5th, 1861. Application for reissue received and filed Dec. 23d, 1867. Div. B

I claim, 1st, A platform composed of slats supported at the end next the finger beam only, and arranged to drop the gavel directly behind the finger beam.

2d, The combination with a harvesting machine of a platform (to support the falling grain) made of slats arranged at an angle to the finger beam, and supported at the end next the finger beam only.

3d, The combination of a reel with a platform composed of slats supported at one end only.

4th, The combination of a reel, a slatted platform and a cut off, or device for receiving the cut and falling grain while the gavel is being discharged.

5th, The combination with a slatted platform, supported at the end next the finger beam only, of a device operated by the driver for discharging the gavel directly behind the finger beam.

6th, The combination of a platform, hinged at its front end only, and a vertically moving cut-off with a device operated by the driver, who by a single movement drops the gavel and interposes a cut-off to receive the grain, which falls during the discharge of the previously accumulated gavel.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio. Dated Oct. 5th, 1861. Application for reissue received and filed Dec. 23d, 1867. Div. C.

I claim, 1st, A cut-off composed of a bale or rod actuated by the tilting of the platform to discharge the gavel.

2d, A cut-off automatically operated by the dropping of the platform.

3d, The combination with a platform which drops the gavel directly behind the finger beam of a vertically moving cut-off.

4th, The combination with a slatted platform supported at the end next the finger beam only, of a cut-off moving in the arc of a circle, to receive the falling grain during the discharge of the gavel.

5th, The combination of a cut-off with a hinged finger beam and platform.

6th, The combination of a cut-off with a slatted platform and a hinged finger beam.

7th, The combination with a hinged finger beam of a reel and a cut-off.

8th, The combination with a hinged finger beam of a reel, a cut-off, and a slatted platform.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio. Dated Oct. 5th, 1861. Application for reissue received and filed Dec. 23d, 1867. Div. D.

I claim, 1st, The combination with a hinged finger beam of a platform supported at one end only.

2d, The combination with a hinged finger beam of a platform hinged at its forward end to said beam.

3d, The combination with a hinged finger beam of a platform composed of slats arranged at an angle to the finger beam.

4th, The combination with a hinged finger beam of a tilting platform.

5th, The combination with a hinged finger beam of a tilting platform and a reel.

6th, The combination with a horizontally folding finger beam of a platform so hinged as to turn up vertically, or nearly so, to enable the finger beam to fold close to the machine.

7th, The combination with a two-wheeled side draught hinge joint machine of a dumping, dropping, or tilting platform, connected with the main frame through the medium of the finger beam only.

8th, The combination in a two-wheeled side draught hinge joint machine of an adjustable cutting apparatus, a tilting platform and a lifting mechanism, in such manner that said cutting apparatus and platform can be raised for passing obstructions while the machine is in motion.

9th, The combination with a tilted slatted platform and a floating finger beam of a wheel supporting the divider end of the finger beam.

10th, The combination with a horizontally folding finger beam and tilting platform, and of a caster wheel supporting the divider end of the finger beam and platform.

67,954.—DEVICE FOR PREPARING PLATES FOR SPRINGS.—Jas. B. Cleveland, Hackensack, N. J. Dated Aug. 20th, 1867. Application for reissue received and filed Nov. 25th, 1867.

I claim forming the tapering ends or points of the spring plates, P P', figs. 1 and 2, into their proper widths and thickness, ready for use, without hammering, by means of concave dies, A A' and B B', which may be operated by any suitable device, for the purpose as above set forth.

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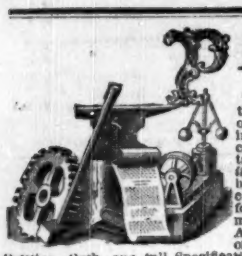
PATENTS



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